THE DEATH WARRANT OF MARY STUART



In many ways, Queen Elizabeth of England was a very good and wise queen, but she was guilty of one cruel deed which will remain a blot upon her memory forever. She hated Mary, Queen of Scotland, and secretly desired her death, and when the poor, weak queen fell into her power, she cast her into prison. Here we see Davison persuading Queen Elizabeth to sign Mary's death warrant, which she finally did.

The Book of Knowledge

The Children's Encyclopædia

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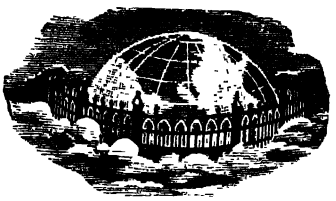
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This is a short guide only to the principal contents of this volume. It is not possible to give the titles of all the Poems and Rhymes, Legends, Problems, color pages, questions in the Wonder Book, and many other things that come into the volume; but in all cases the pages where these parts of our book begin are given. The full list of these things comes into the big index to the whole work.

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THE MAN WHO GAVE AWAY

CONTINUED FROM 2065

ONCE in England there was a man who lived with one old servant in a little cottage in the country. He had no wife and no children; all his brothers and sisters were dead; besides the old woman who looked after his cottage, made his bed, and cooked his meals, there was no one to be fond of this solitary man.

But he was not unhappy. He had a dog called Don, who was the faithful companion of all his walks. His study was full of beautiful books, which he read with delight. His little garden was bright and fragrant all the year round with flowers, which he cared for himself and loved very dearly. And in the winter he spread bread-crumbs on his window-sill, and the birds learned to come into his house and even to eat food out of his hand.

And yet he felt that something was lacking in his life. There was something he needed, he couldn't tell what it was, but something that would complete his simple happiness and fill his quiet life with content. He used to sit quite still at night wondering what this mysterious something could be.

One winter's afternoon, when he was walking through the snow in a lonely country lane with Don, he passed a workman and his wife and their little family, trudging patiently along in search of work. The man carried a little girl in his arms; the woman pushed a shabby baby-carriage, which was full of old clothes; two boys and a girl lagged behind, footsore and tired.

When they had passed, the solitary man said to himself: "I ought to have given them a few coppers; they are very poor; a little money would have cheered them up Dear me, it was foolish of me not to have thought of it at the time. Three or four coppers would have made a world of difference to those poor people."

That night he could not sleep for a long time. In the darkness of his bedroom, where a comfortable fire was just beginning to die down, he saw the picture of the workman's family—the little shabby and tired procession of human beings, trudging wearily through the snow.

"Dear me," he kept muttering, "a few cents would have made all the difference to those poor people."

The next day he unchained Don from the kennel and started out, with the hope of meeting the poor people.

"If I do not meet them," he said, "perhaps I shall meet others just as poor who will be glad of a few coppers"

But he met no one at all.

That night he was really very unhappy. He could not read, he could not write, he could not do anything

but sit and think how unhappy he was, because he had met no poor people.

"To-morrow," he said, "I will not walk in the lanes, but in the high-road, and there I shall surely meet some poor people who will be glad of a few cents. I shall never be happy unless I can make other people happy too."

The next day he walked on the high-road, and very soon he met a family of poor people tramping wearily along in search of work. Don barked at them, and his master called him away.

"I don't wonder the dog barks at us," said the laborer bitterly; "for we look more like tramps than respectable people."

The gentleman saw what a fine-looking man was this poor laborer, and he saw, too, how cold and hungry looked the children. It struck him that a few cents would not be enough. He must give them more. He put his hand in his pocket and drew out a half-dollar.

"There," he said, "take that—it will help you along the road, perhaps."

The workman stared open-eyed at the half-dollar, and then, with a bright smile, he exclaimed joyfully: "I feel a new man!" He thanked the giver, and passed on.

"Dear me," said the gentleman, "I ought to have given him a dollar. Those poor little children looked very tired and dreadfully hungry."

He felt unhappy until he met a young widow carrying a child in her arms and leading another by the hand.

"Would a dollar help you along the road?" asked the gentleman, with a kind smile.

The woman's face, which had been grey and sad, became, all of a sudden, glad and animated.



"What a lot of poor people!" he exclaimed, as he lay on his bed. "Dear me, what a lot of poor people!" No doubt all those poor people had come to cheer his spirit on its way with a thankful "God bless you!"

"A dollar!" she exclaimed. "Why, a dollar is heaven!"

The gentleman smiled with pleasure.

"There," said he; "I hope it will make you happy."

"It has made a new woman of me," said the poor widow, staring.

A feeling of great pleasure took possession of the gentleman's heart. "How easy it is," he said that night, "to make oneself extremely happy. I have spent a dollar and a half to-day, and really I never bought anything in my life which gave me so much pleasure. The surprize in their faces when they saw the money—how nice that was! Surprize is a great thing, a very great thing. I like surprizing poor people. It is most convenient that a little piece of money should be able to drive despair out of a poor human heart."

Life seemed to him now a much happier matter. He still had his books, his birds, his flowers, and his faithful dog; but in addition to those he had a little secret of happiness all to himself.

He kept seeing in his dreams the light which shone in the faces of the workman and the widow when they saw the silver. He kept hearing the words "I feel a new man" and "It has made a new woman of me."

"Really," he said, when he woke up, "I feel a new man myself."

As he was shaving he suddenly stopped, lowered the razor, and looked at his lathered face in the glass. "If a dollar can make poor people so happy, what would two do?" The idea filled him with pleasure. "And two dollars would certainly make these poor people very happy indeed."

From that day onward, this gentleman, who was not very old and not very rich, made long walks into different parts of the country, and whenever he saw very poor people, who looked as if they wanted to be better and happier, he took two dollars from his pocket, and said to them: "That will help you to feel the sun is still shining." They would call after him: "God bless you, sir!" astonished by his gifts; and those blessings of the very poor became the chief happiness of this once solitary man. He seemed to be always hearing in his ears the words "God bless you!" which are the best words in the world.

He lived to be an old man, and when he could not walk long distances he bought a phaeton and a pony, and drove himself along the roads, particularly in wet and cold weather, with a pocket full of two dollar bills.

His old servant would say to him:

"Why, master, what for do you want to go out driving on such a bad day as this? Why, I wouldn't turn a dog out in such miserable weather!"

"Oh, come," he would say, "a little wind and rain is good for the complexion; I want to keep young, Betty; I want to keep young and handsome as long as ever I can."

His face brightened just before his death. "What a lot of poor people!" he exclaimed. "Dear me, what a lot of poor people!" No doubt all those poor people had come to cheer his spirit on its way with a thankful "God bless you!"

THE ANGEL OF THE DIMPLES

AN angel, just about to fly away from the world, perceived as it fluttered on the surface of the earth a child, sleeping in some long grass under the shadow of some plants.

"What a lovely child!" exclaimed the angel. "It must have been stolen from heaven."

And to make quite sure that the little creature really belonged to the earth, and that its body was really made as, alas! all earthly bodies are made, of perishable stuff, the angel, with two fingers of its divine hand, fingers which were rosy with the beauty and tint of heaven, touched the baby cheeks.

He touched them quite close to the mouth, on each side of the lips, at the place where ends the circle of the smile. Then, reassured, the angel said: "The child is really human, after all." Leaving the child alone, the angel flew away.

But where they had rested, his fingers had left their prints.

That is why, my daughter, my dear little babe, on each of thy cheeks, when thou beginnest to smile, two little dimples appear—two pretty little dimples of the angels!

That is why I so often amuse myself by making thee laugh, just to see thy dimples from the angels of heaven!

THE STORY OF LITTLE RED RIDING-HOOD

A LITTLE girl once lived in a cottage at the edge of a great wood. Her mother had made her a pretty little red cloak with a hood to fit over her fair curls, and she was so fond of it that she hardly ever wore anything else. And so everybody called her Little Red Riding-Hood.

At the other side of the wood was a tiny house among the trees, where Little Red Riding-Hood's grandmother lived all alone. One fine afternoon Little Red Riding-Hood's mother said:

"Your grandmother is not very well. In this basket I have put some eggs, a jar of honey, and some butter Put on your cloak, and take them to her, with my love. But be sure that you do not stay long on the way, because it will soon be dark, and then, you know, the wolves come out"

So Little Red Riding-Hood put on her cloak, and away she went.

But the wild flowers were very beautiful in the wood, and she put down her basket on the trunk of a tree and began to pick them.

Little Red Riding-Hood was very fond of flowers. She knew all their names, and when she spoke to them she loved them so that she thought they understood all that she was saying.

The little grey squirrels, with their funny long tails, darted out from the bushes and ran up the trees, where the birds were singing among the leaves. And Little Red Riding-Hood forgot all about the wolves.

Soon it began to grow dark, and, remembering what her mother had said, she jumped up, and was picking up her basket, when there bounded up to her a great wolf!

"Where are you going?" asked the wolf. He spoke so kindly in his big, gruff voice that Little Red Riding-Hood thought he could not possibly hurt her. So she told him she was carrying some eggs and honey and butter to her grandmother, who lived in the little house at the edge of the forest.

"Oh," said the wolf, "I know where that is!" And he ran on and was soon out of sight.

The wolf ran very fast, and did not stop until he came to the little house. He knocked at the door, and the grandmother's voice called out:

"Pull the bobbin and the latch will go up."

He pushed open the door, and, going straight up to where the old lady lay in bed, opened his mouth and devoured her! Then he put on her nightdress and cap, jumped into the bed, and cuddled down among the clothes. Presently came a tap at the door.

"Pull up the bobbin and the latch will go up!" called out the wolf in a voice like the grandmother's.

Little Red Riding-Hood walked in.

"Draw up a chair," said the wolf, "and tell me what you have in your basket."

Little Red Riding-Hood got a chair and sat down by the side of the bed.

"I have brought you something nice to eat, granny," she said, as she bent over the bed. "But what great ears you have, grandmamma!"

"All the better to hear you with," said the wolf

"What great eyes you have, grandmamma!"

"All the better to see you with."

"And, oh, what great teeth you have, grandmamma!"

"All the better to eat you with!" cried the wolf, jumping out of bed.

Little Red Riding-Hood ran screaming to the door. The wolf ran after her, and had almost caught her, when a shot from a gun was heard, and the wicked wolf dropped down dead.

A woodcutter who was passing had heard the cries of Little Red Riding-Hood, and popped his gun through the window in time to save her.

Little Red Riding-Hood was very grateful to the woodcutter, but she had been so frightened, and she was so grieved about her grandmother, that she ran weeping all the way home. When she came to the cottage she found her mother waiting for her at the door.

The mother drew Little Red Riding-Hood in, and listened to her story of all that had happened. She was delighted to have her little girl home again, and Red Riding-Hood was so happy to be out of danger that she promised her mother never to be disobedient any more.

LITTLE RED RIDING-HOOD IN THE WOOD



THE WOLF BOUNDED UP TO RED RIDING-HOOD AS SHE GATHERED THE DAISIES IN THE WOOD

Little Red Riding-Hood found the flowers so beautiful that she stopped on her way through the wood to pick them. Soon it began to grow dark, and as she picked up her basket to go there bounded up to her a great wolf.

THE FABLES OF ÆSOP THE SLAVE

THE ANT AND THE GRASSHOPPER

A NEST of ants had been busily occupied all through the summer and autumn in collecting food for the winter, and they had carefully stored it in the



wonderful underground chambers of their home. Thus, when the winter came, they had plenty of food to eat.

One cold day a grasshopper, who was almost starved with cold and hunger, came to the ant-hill and begged that the ants would give him a little food to save his life.

One of them asked him how he had spent his time during the summer, and whether he had not saved up anything for the winter. He replied: "Alas! gentlemen, I spent all my time in singing, playing, and dancing, and never once thought about the winter."

The ant answered: "Then we have nothing to give you; for people who play all the summer must expect that they will have to starve in the winter."

Lay by for a rainy day.

THE WOLF AND THE KID

A WOLF one day saw a kid that had strolled into a distant field, and pursued it. The kid ran away as fast as it could, but finding that the wolf was



overtaking it, and that it had no chance to escape, it turned round and said:

"I see that it is of no use to run away, and that I am going to be eaten. But I would like to die as pleasantly as possible, so please play me a tune, and let me have a dance before you kill me."

The wolf played a tune on the pipes, and the kid danced merrily up and down the field. The result was that the noise of the pipes attracted the dogs from the farm, who rushed up and drove the wolf away.

As he escaped into the forest he said: "This is the consequence of meddling with things that do not concern one. My business was to play the butcher, and not the piper."

Never meddle with things that do not concern you.

THE TWO LOADED ASSES

ONE day two asses were traveling along the road. The one was loaded with salt, and the other with sponges. Presently they came to a river, and as there was no bridge they had to wade through the water



The ass with a load of salt went first, and happened to stumble over a stone, so that he fell down in the water. He was soon on his feet again, but the water dissolved a great part of the salt and washed it away from the baskets on his back, so that the donkey found himself relieved of a great part of the load which he carried.

The ass with the load of sponges noticed this, and at once thought that he would do the same. So he lay down for a minute in the stream; but, to his astonishment, he found that, instead of the sponges being dissolved away, they soaked up a quantity of water, and his load was many times heavier than it was before. The result was that he could not get up, and the stream, which had relieved the one of his burden, drowned the other.

One man's meat is another's poison.



A TALE OF CHRISTMAS EVE

TOLD BY A CHRISTMAS STOCKING

IT was long past midnight, and the Stocking was angry.

"To be taken out of a nice comfortable drawer on a winter night," it said querulously, "and, without being hung on a nice horse in front of the kitchen fire, to be strung up to a bedpost like a common thing. Upon my word, it is too bad!"

A little girl lay fast asleep in the bed. The curtains were drawn across the window. In a saucer on the bureau burned a night-light. The clothes of the sleeper lay neatly folded on a chair beside the wall; the stockings which she had worn during the day hung dreaming over the back of this chair, and underneath were her little buckled shoes, both of them snoring.

"I miss my mate," said the Stocking, glancing at the folded pair of sleeping stockings over the back of the chair. "It's downright monstrous to take one stocking from a drawer and leave its mate behind! If I worked for a one-legged child or a mermaid it would be a different matter. Oh, my poor heel and toe, how cold it is!"

Just as it finished speaking there was a noise in the chimney, and, looking in the direction of the fireplace, the Stocking was amazed to see a very old, white-bearded gentleman in a red cloak, with a hood on his head descending to the hearth. The night-light burned suddenly brighter; the room became warm and cheerful. The Stocking, which was too wonder-struck to speak, thought that it had never seen such a quaint old man in all its life.

"If this is a burglar," it thought, "may I have a potato in my heel for the rest of my life!"

The old gentleman, who was no other person than Father Christmas, advanced to the bed and let a big bag which he carried on his shoulder slide to the ground.

"Ha," he said, in a very cheerful voice, "how she has grown, to be sure! Why, when I was here twelve months ago I could have put her into one of my waistcoat pockets." He looked about the room. "Nice and tidy," he said approvingly. "Clothes neatly folded; frock hung up; books nicely put away; no broken toys about; the doll I gave her last year safely tucked up in its cradle, the Teddy Bear hasn't lost an eye, and grey rabbit is still full of sawdust. Come, Marsie, you're growing quite a good little girl." He walked to the foot of the bed. "Ha," he said, laughing, "this is the only night in the year when the foot of the bed has a stocking!" He put his hand on the



Stocking, and said: "Well, my grumbling friend, how do you find yourself to-night?"

"Rather lonely," answered the Stocking. "I miss my mate terribly; and it's cold. They took me out of my nice warm drawer and hung me up here alone in the dark without a glimpse of the fire."

"Oh, I'll warm you quick enough!" said Father Christmas, and, diving into his sack and pulling out all manner of toys and boxes of sweets, he began to cram the Stocking with Christmas presents.

"Hold hard!" cried the Stocking. "You'll split me if you aren't careful! What next, I wonder! I'm a stocking. What do you take me for—a Danish bazaar, the toy department of a big store, or what?"

Father Christmas laughed.

"You're new to this game, then?" he asked.

"I was only born this winter," said the Stocking. "I grew on a very nice sheep in Russia until the beginning of the spring. Then I was cut off, sent to a mill, and woven into the handsome stocking that you see I am now. I've only been worn four times, and I've scarcely shrunk the eighth of an inch in the wash. I thought I was in for a very easy life. My young lady doesn't wear me hard, and Neto, her auntie, is a good darner. I go for walks in the garden, rides with the pony, and drives in the motor-car. If it's very cold they wrap me in leggings, and put a nice fur rug over them. Hi! What are you up to now? I can't bear any more! You're stretching me out of shape! You'll burst me!"

In the morning, very early, Marsie woke up and emptied the Stocking of all its toys and sweets, and let it fall on the floor. Aunt Neto came later, kissed the little maid, and picked up the Stocking.

"Your work is done," said she, and placed the Stocking back in the drawer.

"Well," said its mate, "and where have you been all the night? Staying out by yourself till the morning like this! You ought to be ashamed of yourself, you know you ought!"

"My dear," said the Stocking, "I've never worked so hard before or been so happy. But permit me to wish you a merry Christmas and a happy New Year," and snuggling down in his drawer, he went to sleep.

CATCHING A THIEF

THE ADVENTURE OF SCREWWORM, SCRAMBLEPIPE, & BURROWJACK

"WE must put a stop to this thieving," said Scramblepipe. Another gnome named Burrowjack nodded his head and thoughtfully combed his beard with his finger-nails.

"It's my belief," he said slowly, "that the villain lives above ground."

"Ah," cried Screwworm, "I'm positively certain of that!"

Scramblepipe and Burrowjack looked at Screwworm.

"Yes," said Screwworm, who was a particularly small and a particularly venerable gnome, "I'm as certain of that as I am of fireworks, ironmongery, boiled potatoes, tableaux vivants, and apple-blossom. And I'll tell you why. *Three nights in succession I've dreamed of white coal!*"

"You don't say so!" exclaimed the other two.

"Three nights running," said Screwworm emphatically.

"What, running fast?" demanded Burrowjack with much concern.

"Those nights travelled at sixty minutes the hour," replied Screwworm solemnly.

The other two gnomes whistled with amazement.

For some weeks past the wife of Scramblepipe had missed several magnificent diamonds. Although a watch had been set, the diamonds still went. The entire underworld of gnomes had been alarmed by these robberies. It was agreed that if the thief was not very soon laid by the heels every gnome would have to turn out his pockets. This was a dreadful fear; for, as everybody knows, the pockets of a gnome contain enough red pepper to sneeze the crust off the earth.

"We'll keep a watch above ground," said Scramblepipe.

"A stop watch," said Burrowjack, with great resolution.

That night they stole noiselessly out of their black underworld. They crept on all fours, holding their breath. They

were as careful as mice, as silent as cats. Scramblepipe went first, then Burrowjack, and then Screwworm. They crept from the blackness of the earth into the white moonlight of the forest. Not a leaf was stirring; not a sound rustled the stillness.

Suddenly old Screwworm screeched in a loud voice:

"There he is! That's the villain! See how guilty he looks! Throttle him, stab him, cut him into mincemeat, tickle his ribs and fry his toes!"

The other two looked where he pointed, and saw Tom Squirrel burying something in the ground.

"Thief! Thief!" they cried in loud voices. They began to dance with fury.

Tom Squirrel looked up, brushed his whiskers with his paws, and then ran up a tree.

"Fetch a ladder!" cried Screwworm.

"And a policeman's whistle!" shouted Burrowjack.

"And a club to knock his head off!" yelled Scramblepipe.

The three little gnomes ran frantically about in every direction, screaming all the time:

"Now we've got him! Now we'll catch him! Oh my, isn't it Turkish delight to catch a thief?"

They got a ladder and sticks and a policeman's whistle, and ran to the tree. Tom Squirrel sprang lightly to a branch and sat down. Burrowjack put the ladder to the tree. Scramblepipe jumped about, waving his stick. Old Screwworm blew the policeman's whistle till he was red in the face. Tom Squirrel blinked his eyes and hummed softly: "Gnome, Sweet Gnome."

Scramblepipe went up the ladder. Tom Squirrel cocked his tail and hopped to another tree. Down came Scramblepipe, chuckling with delight, and the ladder was put to the other tree.

"Your turn now," said Scramblepipe to Burrowjack.

"Right you are, old gingerbread!" said Burrowjack, and ran up the ladder with his stick held tightly between his teeth.

Tom Squirrel hopped to another tree, and down came Burrowjack, screaming with laughter.

"Your turn now, Screwworm," said Burrowjack. And old Screwworm, putting his policeman's whistle behind his ear, mounted the ladder one step at a time.

"Steady does it," said the old fellow.

"Mind your feet don't get cold," said Scramblepipe.

"Hullo! Hullo! Hullo!" cried Screwworm suddenly. "What have we here? Blushing birds! Birds a-blushing, and under their own noses, too? They're the thieves! They're the thieves! Now we've got them!"

He had seen a nest of red-breasted birds on the next tree. The other two swarmed up to this nest and pulled it down. They tore it to pieces, and searched among the twigs and moss and horsehair, but could find no diamonds.

"It's a mare's nest!" cried Burrowjack angrily, looking at Screwworm with a threatening eye.

"Don't hit me," pleaded Screwworm. "I can't bear being hit in the moonlight, not even on the top of the head."

One of the little birds moved at Scramblepipe's feet. He stooped down to pick it up, and saw in a hollow of the old tree an immense toad.

"Hist!" he said "Let's have a joke. Here's old Tom Tiddler, fast asleep!"

They got sticks and pieces of wood, and, laughing fit to split their sides, boarded up the old toad in his hole.

"He'll never get out," they chuckled. "What a lark! He's there till the crack of doom! Oh, isn't that beatific?"

"And now for Tom Squirrel," said Burrowjack, growing serious.

But when they looked up, Tom Squirrel was nowhere to be seen. Scramblepipe stroked his chin; Burrowjack bit his nails.

"Never mind," said Screwworm cheerfully, "we've had a jolly night, haven't we?"

They were just about to start off, when a faint sound of laughing checked them.

"What's that?" they cried. They listened, with fingers to their lips.

"It must be Tom Squirrel," whispered Burrowjack.

"He's hiding and laughing at us," said Scramblepipe.

"Oh, he's the thief sure enough!" said old Screwworm.

"Wait till we catch him!" said Burrowjack in a threatening tone.



TOM SQUIRREL LOOKED UP, BRUSHED HIS WHISKERS, AND RAN UP A TREE

"Ah, he won't laugh then!" said Scramblepipe, and they went off together, saying, in loud voices:

"You'll laugh on the other side of your face when we catch you, Tom Squirrel."

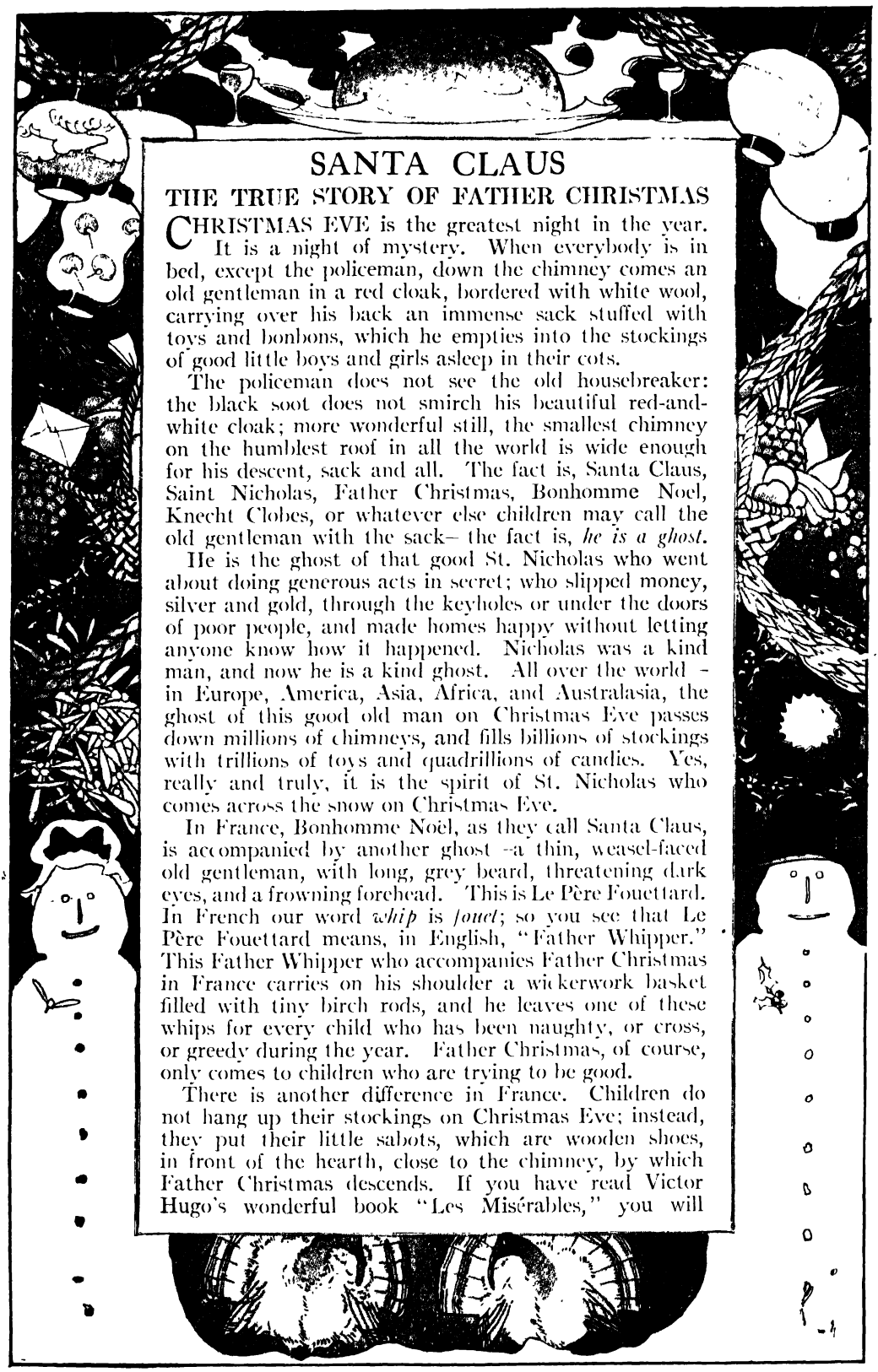
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The world went well with Tom Squirrel for many a day, and the three gnomes were all forgotten when, a hundred years afterwards, the old tree was cut down, and the woodman was surprised to see a very ancient toad hop out of a hole, laughing so uproariously that his skin kept cracking in all directions.

"What are you laughing at?" asked the woodman.

"I've been laughing for a hundred years," said the toad, as he hopped off to the pool for a drink of water, still laughing furiously.

Looking into the hole, the woodman was amazed to see—what do you think? A heap of magnificent diamonds in the place where the toad had been squatting!



SANTA CLAUS

THE TRUE STORY OF FATHER CHRISTMAS

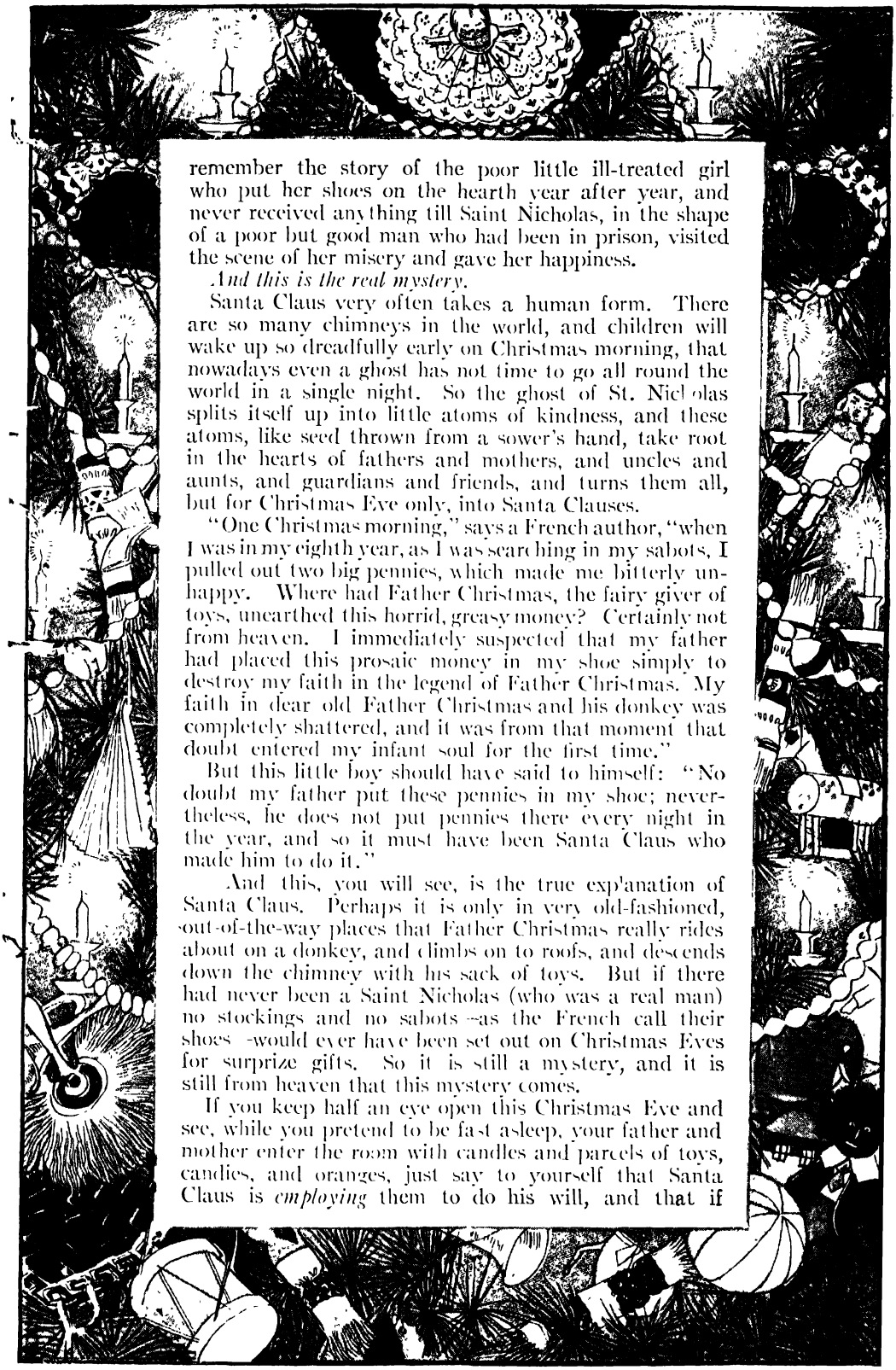
CHRISTMAS EVE is the greatest night in the year. It is a night of mystery. When everybody is in bed, except the policeman, down the chimney comes an old gentleman in a red cloak, bordered with white wool, carrying over his back an immense sack stuffed with toys and bonbons, which he empties into the stockings of good little boys and girls asleep in their cots.

The policeman does not see the old housebreaker: the black soot does not smirch his beautiful red-and-white cloak; more wonderful still, the smallest chimney on the humblest roof in all the world is wide enough for his descent, sack and all. The fact is, Santa Claus, Saint Nicholas, Father Christmas, Bonhomme Noel, Knecht Clobes, or whatever else children may call the old gentleman with the sack– the fact is, *he is a ghost.*

He is the ghost of that good St. Nicholas who went about doing generous acts in secret; who slipped money, silver and gold, through the keyholes or under the doors of poor people, and made homes happy without letting anyone know how it happened. Nicholas was a kind man, and now he is a kind ghost. All over the world – in Europe, America, Asia, Africa, and Australasia, the ghost of this good old man on Christmas Eve passes down millions of chimneys, and fills billions of stockings with trillions of toys and quadrillions of candies. Yes, really and truly, it is the spirit of St. Nicholas who comes across the snow on Christmas Eve.

In France, Bonhomme Noël, as they call Santa Claus, is accompanied by another ghost –a thin, weasel-faced old gentleman, with long, grey beard, threatening dark eyes, and a frowning forehead. This is Le Père Fouettard. In French our word *whip* is *fouet*; so you see that Le Père Fouettard means, in English, "Father Whipper." This Father Whipper who accompanies Father Christmas in France carries on his shoulder a wickerwork basket filled with tiny birch rods, and he leaves one of these whips for every child who has been naughty, or cross, or greedy during the year. Father Christmas, of course, only comes to children who are trying to be good.

There is another difference in France. Children do not hang up their stockings on Christmas Eve; instead, they put their little sabots, which are wooden shoes, in front of the hearth, close to the chimney, by which Father Christmas descends. If you have read Victor Hugo's wonderful book "Les Misérables," you will



remember the story of the poor little ill-treated girl who put her shoes on the hearth year after year, and never received anything till Saint Nicholas, in the shape of a poor but good man who had been in prison, visited the scene of her misery and gave her happiness.

And this is the real mystery.

Santa Claus very often takes a human form. There are so many chimneys in the world, and children will wake up so dreadfully early on Christmas morning, that nowadays even a ghost has not time to go all round the world in a single night. So the ghost of St. Nicholas splits itself up into little atoms of kindness, and these atoms, like seed thrown from a sower's hand, take root in the hearts of fathers and mothers, and uncles and aunts, and guardians and friends, and turns them all, but for Christmas Eve only, into Santa Clauses.

"One Christmas morning," says a French author, "when I was in my eighth year, as I was searching in my sabots, I pulled out two big pennies, which made me bitterly unhappy. Where had Father Christmas, the fairy giver of toys, unearthed this horrid, greasy money? Certainly not from heaven. I immediately suspected that my father had placed this prosaic money in my shoe simply to destroy my faith in the legend of Father Christmas. My faith in dear old Father Christmas and his donkey was completely shattered, and it was from that moment that doubt entered my infant soul for the first time."

But this little boy should have said to himself: "No doubt my father put these pennies in my shoe; nevertheless, he does not put pennies there every night in the year, and so it must have been Santa Claus who made him to do it."

And this, you will see, is the true explanation of Santa Claus. Perhaps it is only in very old-fashioned, out-of-the-way places that Father Christmas really rides about on a donkey, and climbs on to roofs, and descends down the chimney with his sack of toys. But if there had never been a Saint Nicholas (who was a real man) no stockings and no sabots—as the French call their shoes—would ever have been set out on Christmas Eves for surprize gifts. So it is still a mystery, and it is still from heaven that this mystery comes.

If you keep half an eye open this Christmas Eve and see, while you pretend to be fast asleep, your father and mother enter the room with candles and parcels of toys, candies, and oranges, just say to yourself that Santa Claus is *employing* them to do his will, and that if

St. Nicholas had not lived and done kindly things you would never have had that box of soldiers, that automobile, that farmyard, that grocer's shop, that doll, that box of chocolates, that pair of reins, that book of fairy-tales, those crackers, and that box of candied fruit.



AN OLD GENTLEMAN IN A RED CLOAK CARRIED ON HIS BACK A SACK STUFFED WITH TOYS

Is it not much more mysterious than Santa Claus himself? Do not think that you are very sharp and clever to have found out how the toys and candies come to you on Christmas Eve. It is one of the great mysteries of life.

For once upon a time there lived a rich young man who tried, because he so much admired the kind and gentle character of Christ, to make his money give other people happiness. He went about placing coins and gifts in the homes of poor people. He did good in secret. The name of this young man was Nicholas. When he died people called him Saint Nicholas. He died and was buried like any ordinary man. But one man, whom men called Nicholas, has from his grave, for hundreds of years, inspired the whole civilized world to be kind and generous on Christmas Eve. He was not a mighty warrior, but he has done more for the happiness, kindness, and good-humour of the world than Cæsar or Napoleon. Is that not a far greater mystery than Santa Claus and his donkey?

Learn from this story that a beautiful character is more powerful than any fairy, and understand that your presents at Christmas are given to you in secret only that you, when you grow up, may follow the example of Saint Nicholas, and give without telling.

Santa Claus, even if he come in your father's or your mother's body, is still the loving spirit of the good Nicholas.

NEXT STORIES WILL BEGIN ON PAGE 2311.



GOD REST YOU, MERRY GENTLEMEN!

Carol-singing at Christmas-time is, of course, a very ancient custom. Long ago the carols were purely religious hymns, expressing joy for the birth of the Saviour Christ, but in the course of time all sorts of merry tunes specially composed for singing at Christmas-time came to be known as carols. This is one of the oldest carols, and it tells the story of Christ in simple verses. It has been sung in England for centuries, and there are many different versions of the carol, but that given here is perhaps the best.

CONTINUED FROM 2134

GOD rest you, merry gentlemen,
Let nothing you dismay;
For Jesus Christ, our Saviour,
Was born upon this day,
To save us all from Satan's power,
When we were gone astray.

O tidings of comfort and joy,
For Jesus Christ, our Saviour, was
Born on Christmas Day.

In Bethlehem, in Jewry,
This blessed Babe was born,
And laid within a manger
Upon this blessed morn;
The which His mother Mary
Nothing did take in scorn.
O tidings, etc.

From God, our Heavenly Father,
A blessed Angel came,
And unto certain shepherds
Brought tidings of the same;
How that in Bethlehem was born
The Son of God by name.
O tidings, etc.

"Fear not," then said the Angel,
Let nothing you affright;
This day is born a Saviour,
Of virtue, power and might,
So frequently to vanquish all
The friends of Satan quite."
O tidings, etc.

The shepherds, at those tidings,
Rejoiced much in mind,
And left their flocks a-feeding
In tempest, storm and wind;
And went to Bethlehem straightway
The Son of God to find.
O tidings, etc.

But when to Bethlehem they came,
Whereat this Infant lay,
They found Him in a manger,
Where oxen feed on hay;
His mother Mary kneeling,
Unto the Lord did pray.
O tidings, etc.

Now to the Lord sing praises,
All you within this place,
And with true love and brotherhood
Each other now embrace;
This holy tide of Christmas
All others doth deface.

O tidings of comfort and joy,
For Jesus Christ, our Saviour, was
Born on Christmas Day.

OLD CHRISTMAS

The very spirit of the old fashioned Christmas, which unhappily has largely passed away, breathes again in these graphic verses from the pen of the great Sir Walter Scott. In the twenty sixth line the word "underogating" means that the nobleman, "without losing his dignity" may at this festal season play at games with the humble villager.

HEAP on more wood! the wind is chill.
But let it whistle as it will,
We'll keep our Christmas merry still.

Each age has deem'd the new-born year
The fittest time for festal cheer,
And well our Christian sires of old
Loved when the year its course had roll'd
And brought blithe Christmas back again
With all his hospitable train.
Domestic and religious rite
Gave honour to the holy night;
On Christmas Eve the bells were rung;
On Christmas Eve the mass was sung.
That only night in all the year
Saw the stoled priest the chalice rear.
The damsel donn'd her kirtle sheen,
The hall was dress'd with holly green;
Forth to the wood did merry-men go,
To gather in the mistletoe.
Then open'd wide the baron's hall
To vassal, tenant, serf, and all,
Power laid his rod of rule aside,
And Ceremony doff'd his pride.
The heir, with roses in his shoes,
That night might village partner choose;
The lord, underogating, share
The vulgar game of "post and pair."
All hail'd with uncontroll'd delight
And general voice, the happy night,
That to the cottage, as the crown,
Brought tidings of Salvation down.

The fire, with well-dried logs supplied,
Went roaring up the chimney wide;
The huge hall-table's oaken face,
Scrubb'd till it shone, the day to grace,
Bore then upon its massive board
No mark to part the squire and lord,
Then was brought in the lusty brawn,
By old blue-coated serving-man;
Then the grim boar's head frown'd on high,
Crested with bays and rosemary.
Well can the green-garb'd ranger tell,
How, when, and where, the monster fell;
What dogs before his death he tore,
And all the baiting of the boar.
The wassail round, in good brown bowls,
Garnish'd with ribbons, blithely trowls.
There the huge sirloin reek'd; hard by
Plum-porridge stood, and Christmas pie;
Nor fail'd old Scotland to produce,
At such high tides, her savoury goose.
Then came the merry-makers in,
And carols roar'd with blithesome din;
If unmelodious was the song,
It was a hearty note, and strong.
Who lists may in their mumming see
Traces of ancient mystery,
White shirts supplied the masquerade,
And smutted cheeks the visors made;—
But, O! what maskers, richly dight,
Can boast of bosoms half so light!
England was merry England, when
Old Christmas brought his sports again.
'Twas Christmas broach'd the mightiest ale,
'Twas Christmas told the merriest tale,
A Christmas gambol oft could cheer
The poor man's heart through half the year.

CHRISTIANS, AWAKE!

This famous carol was written by John Byrom, who was born at Kersal in 1691, and died at Manchester in 1763. Most of his poetry is humorous, but this beautiful song he wrote in 1745 for his little daughter, Dorothy. He had promised to write her something for Christmas, and on Christmas morning she found the manuscript of "Christians, Awake!" among her presents. But the title he had given to the poem was, "Christmas Day for Dolly."

CHRISTIANS, awake! Salute the happy morn,
Whereon the Saviour of mankind was born.
Rise to adore the mystery of love,
Which hosts of angels chanted from above;
With them the joyful tidings first begun
Of God Incarnate and the Virgin's Son

Then to the watchful shepherds it was told,
Who heard the angelic herald's voice,
"Behold,
I bring good tidings of a Saviour's birth
To you and all the nations upon earth
This day hath God fulfill'd His promised word,
This day is born a Saviour, Christ the Lord."

He spake; and straightway the celestial choir
In hymns of joy, unknown before, conspire
The praises of redeeming love they sang,
And Heaven's whole orb with Alleluias rang;
God's highest glory was their anthem still,
Peace upon earth, and unto men good will.

To Bethlehem straight the enlighten'd shepherds ran,
To see the wonder God had wrought for man;
And found, with Joseph and the Blessed Maid
Her Son, the Saviour, in a manger laid
Then to their flocks, still praising God, return,
And their glad hearts with holy rapture burn

O may we keep and ponder in our mind
God's wondrous love in saving lost mankind.
Trace we the Babe, who hath retrieved our loss,
From His poor manger, to His bitter Cross,
Tread in His steps, assisted by His grace,
Till man's first heavenly state again takes place.

Then may we hope, the angelic hosts among,
To sing, redeem'd, a glad triumphal song
He that was born upon this joyful day,
Around us all His glory shall display;
Saved by His love, incessant we shall sing
Eternal praise to Heav'n's Almighty King.

CHRISTMAS MORNING

Edwin Waugh, who was born in 1817 and died in 1890, achieved considerable fame through his writings in the Lancashire dialect. Though his best poems were composed in the quaint words of Lancashire, he also wrote in the proper English language. In this English poem he expresses very brightly the spirit of Christmas, which breathes of thankfulness for the birth of Christ.

COME, all ye weary wanderers,
Beneath the wintry sky;
This day forget your worldly cares
And lay your sorrows by.
Awake and sing,
The church bells ring,
For this is Christmas morning!

With grateful hearts salute the morn,
And swell the streams of song
That laden with great joy are borne
The willing air along;
The tidings thrill
With right good will,
For this is Christmas morning!

We'll twine the fresh green holly wreath
And make the Yule log glow,
And gather gaily underneath
The glistening mistletoe;
All blithe and bright,
By the glad firelight,
For this is Christmas morning!

Come, sing the carols old and true,
That mind us of good cheer,
And, like a heavenly fall of dew,
Revive the drooping year.
And fill us up
A wassail-cup;
For this is Christmas morning!

To all poor souls we'll strew the feast,
With kindly heart and free;
One Father owns us, and at least
To-day we'll brothers be.
Away with pride,
This holy tide,
For it is Christmas morning!

So now, God bless us, one and all,
With hearts and hearthstones warm;
And may He prosper great and small,
And keep us out of harm,
And teach us still
His sweet good will
This merry Christmas morning!

In the field with their flocks abiding,
They lay on the dewy ground,
And glimmering under the starlight
The sheep lay white around.
When the light of the Lord streamed o'er them,
And, lo! from the heaven above
An angel leaned from the glory,
And sang his song of love;
He sang, that first sweet Christmas,
The song that shall never cease:
"Glory to God in the highest,
On earth goodwill and peace!

"To you in the city of David
A Saviour is born to-day,"
And suddenly a host of the heavenly ones
Flashed forth to join the lay.
O never hath sweeter message
Thrilled home to the souls of men;
And the heavens themselves had never heard
A gladder choir till then;
For they sang that Christmas carol
That never on earth shall cease:
"Glory to God in the highest,
On earth goodwill and peace!"

And the shepherds came to the manger,
And gazed on the Holy Child;
And calmly o'er that rude cradle
The virgin mother smiled.
And the sky, in the starlit silence,
Seemed full of the angel lay:
"To you in the city of David
A Saviour is born to-day."
O, they sang—and I ween that never
The carol on earth shall cease:
"Glory to God in the highest,
On earth goodwill and peace!"

A HYMN ON THE NATIVITY OF MY SAVIOUR

Ben Jonson was one of the great Elizabethan poets and dramatists, a friend of Shakespeare, a strong, old English type of man, yet he could soften under the influence of the "sweet story of old" to the writing of this tender and beautiful song of praise for the birth of Christ. There is a fine sense of reverence and humility in this Hymn on the Nativity of my Saviour.

I SING the Birth was born to-night,
The Author both of life and light,
The angels so did sound it.
And like the ravish'd shepherds said,
Who saw the light, and were afraid,
Yet search'd, and true they found it.

The Son of God, th' eternal King,
That did us all salvation bring,
And freed the soul from danger;
He whom the whole world could not take,
The Word, which heaven and earth did make,
Was now laid in a manger.

The Father's wisdom will'd it so,
The Son's obedience knew no "No,"
Both wills were in one stature;
And as that wisdom hath decreed,
The Word was now made flesh indeed,
And took on Him our nature.

What comfort by Him do we win,
Who made Himself the price of sin,
To make us heirs of glory!
To see this Babe, all innocence,
A Martyr born in our defence;
Can man forget this story?

LITTLE CHILDREN, WAKE AND LISTEN!

To be simple in words and thought is all that a Christmas hymn need be in order to be well worth singing, for the story of Christ's coming to earth is all the sweeter for being told in the simplest of language. This little hymn for Christmas morning is well written. It is taken from "Williamson's Children's Manual," which was published in 1876.

LITTLE children, wake and listen!
Songs are breaking o'er the earth;
While the stars in heaven glisten,
Hear the news of Jesus' birth.

Long ago, to lonely meadows
Angels brought the message down;
Still each year, through midnight shadows
It is heard in every town.

What is this that they are telling,
Singing in the quiet street?
While their voices high are swelling,
What sweet words do they repeat?

Words to bring us greater gladness,
Though our hearts from care are free;
Words to chase away our sadness,
Cheerless though our hearts may be.

Christ has left His throne of glory,
And a lowly cradle found;
Well might angels tell the story,
Well may we their words resound.

Little children, wake and listen!
Songs are ringing through the earth;
While the stars in heaven glisten,
Hail with joy your Saviour's birth.

JEALOUS JACK FROST

Mr Frederic E Weatherly, the author of this little poem, in which he describes very quaintly one of the unhappy results of the visits of Jack Frost, is a well-known writer of songs which are set to music by our leading composers.

JACK FROST went out on a wintry day,
And he heard a bird singing so blithe and gay;
And he stopped and stared with scorn on his brow
Where the little bird sang on the bare bleak bough.

"Now why are you singing, you bird?" he cried,
"I never could sing, though I've often tried"
And the little bird nodded his head in glee·
"Because I am happy, I sing," said he.

"But why are you happy?" said Jack to the bird.
"*I* never am happy; it's so absurd."
Then louder the little bird sang in glee·
"Because I love and am loved," said he.

Then Jack in a terrible temper flew,
And a cold, long blast on the bird he blew;
And there on the ground he laid him low,
Mute and dead in the cold, cold snow.

ONCE IN ROYAL DAVID'S CITY

No Christmas hymn written in our own day is more popular than this beautiful poem by Mrs Alexander, who was born in 1818 and died in 1895 She wrote many fine poems for children, chiefly on religious subjects Mrs Alexander was the wife of the Bishop of Derry

ONCE in royal David's city
Stood a lowly cattle shed,
Where a Mother laid her Baby
In a manger for His bed;
Mary was that Mother mild,
Jesus Christ her little Child.

He came down to earth from Heaven
Who is God and Lord of all,
And His shelter was a stable,
And His cradle was a stall;
With the poor and mean and lowly,
Lived on earth our Saviour holy.

And, through all His wondrous Childhood,
He would honour and obey
Love, and watch the lowly Maiden
In whose gentle arms He lay;
Christian children all must be
Mild, obedient, good as He.

For He is our childhood's pattern,
Day by day like us He grew;
He was little, weak, and helpless,
Tears and smiles like us He knew.
And He feeleth for our sadness,
And He shareth in our gladness.

And our eyes at last shall see Him
Through His own redeeming love,
For that Child so dear and gentle
Is our Lord in Heav'n above.
And He leads His children on
To the place where He is gone.

Not in that poor lowly stable,
With the oxen standing by
We shall see Him, but in Heaven,
Set at God's right hand on high,
When like stars His children crown'd
All in white shall wait around.

THE BIRTH OF CHRIST

There is real expression of joy and gladness in this hymn by S C Hamerton It is well little I for the voices of the young

WAKEN, Christian children!
Up and let us sing,
With glad voice, the praises
Of our new-born King.

Up! 'Tis meet to welcome
With a joyous lay;
Christ, the King of Glory,
Born for us to-day

Come, nor fear to seek Him,
Children though we be,
Once He said of children:
"Let them come to Me."

In a manger lowly
Sleeps the Heavenly Child;
O'er Him fondly bendeth
Mary, mother mild.

Far above that stable,
Up in heaven so high
One bright star outshineth,
Watching silently

Fear not then to enter
Though we cannot bring
Gold, or myrrh, or incense,
Fitting for a King.

Gifts He asketh richer,
Offerings costlier still;
Yet may Christian children
Bring them if they will.

Brighter than all jewels
Shines the modest eye;
Best of gifts, He loveth
Infant purity.

Haste we then to welcome,
With a joyous lay,
Christ, the King of Glory,
Born for us to-day.

RING OUT WILD BELLS

One of Lord Tennyson's greatest works is a very long poem called "In Memoriam." It is really a whole series of poems in which, over a period of several years, the poet mourns for the loss of a dear friend, Arthur Henry Hallam. The varying seasons of each year are described by the poet, and always he expresses the thoughts which the seasons brought to him while still thinking of his dead friend. In these verses it is the end of the year again and we see that the poet is rejoiced by the music of the midnight bells that ring out the Old Year and ring in the New. He seems to hear in them promise of a brighter day, and, oh, it would be well with the world if the glorious vision of the poet were to come true. But it is ennobling thus to have our minds filled with such thoughts as Tennyson found in the music of the bells.

RING out, wild bells, to the wild sky,
The flying cloud, the frosty light;
The year is dying in the night;
Ring out, wild bells, and let him die.

Ring out the old, ring in the new,
Ring, happy bells, across the snow;
The year is going, let him go;
Ring out the false, ring in the true.

Ring out the grief that saps the mind,
For those that here we see no more;
Ring out the feud of rich and poor,
Ring in redress to all mankind.

Ring out a slowly dying cause,
And ancient forms of party strife;
Ring in the nobler modes of life,
With sweeter manners, purer laws.

Ring out the want, the care, the sin,
The faithless coldness of the times;
Ring out, ring out my mournful rhymes
But ring the fuller minstrel in.

Ring out false pride in place and blood,
The civic slander and the spite;
Ring in the love of truth and right,
Ring in the common love of good.

Ring out old shapes of foul disease;
Ring out the narrowing lust of gold.
Ring out the thousand wars of old;
Ring in the thousand years of peace.

Ring in the valiant man and free,
The larger heart, the kindlier hand,
Ring out the darkness of the land,
Ring in the Christ that is to be.

DEATH OF THE OLD YEAR

In this fine poem Lord Tennyson sounds none of the Christmas joy bells, nor yet a welcome to the New Year. His purpose is to express the feeling of sorrow that comes uppermost in all our hearts as the Old Year goes out. By picturing the Old Year as an actual friend who dies, the poet succeeds in making us feel keen sorrow for its departure.

FULL knee-deep lies the winter snow,
And the winter winds are wearily sighing:
Toll ye the church bell sad and slow,
And tread softly and speak low,
For the Old Year lies a-dying.

Old Year, you must not die;
You came to us so readily,
You lived with us so steadily,
Old Year, you shall not die.

He lieth still, he doth not move;
He will not see the dawn of day.
He hath no other life above.
He gave me a friend, and a true, true love,
And the New Year will take 'em away.

Old Year, you must not go;
So long as you have been with us,
Such joy as you have seen with us
Old Year, you shall not go.

He froth'd his bumpers to the brim;
A jollier year we shall not see.
But tho' his eyes are waxing dim,
And tho' his foes speak ill of him,
He was a friend to me.

Old Year, you shall not die;
We did so laugh and cry with you,
I've half a mind to die with you,
Old Year, if you must die.

He was full of joke and jest,
But all his merry quips are o'er.
To see him die, across the waste
His son and heir doth ride post-haste.
But he'll be dead before.

Everyone for his own.
The night is starry and cold, my friend,
And the New Year blithe and bold, my friend,
Comes up to take his own.

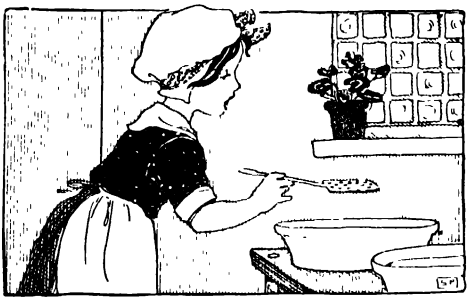
How hard he breathes! over the snow
I heard just now the crowing cock.
The shadows flicker to and fro;
The cricket chirps; the light burns low;
'Tis nearly twelve o'clock.

Shake hands before you die.
Old Year, we'll dearly rue for you
What is it we can do for you?
Speak out before you die.

His face is growing sharp and thin.
Alack! our friend is gone.
Close up his eyes; tie up his chin;
Step from the corpse, and let him in
That standeth there alone,

And waiteth at the door.
There's a new foot on the floor, my friend,
And a new face at the door, my friend,
A new face at the door.

LITTLE VERSES FOR VERY LITTLE PEOPLE



BOUNCE BUCKRAM, velvet's dear;
Christmas comes but once a year.

RIDE away, ride away, Johnny shall ride,
And he shall have pussy-cat tied to one side,
And he shall have little dog tied to the other,
And Johnny shall ride to see his grandmother.

MY maid Mary
She minds her dairy,
While I go a-hoeing and mowing each morn.

Merrily run the reel
And the little spinning-wheel,
Whilst I am singing and mowing my corn.

WHAT is the rhyme for porringer?
The King he had a daughter fair,
And gave the Prince of Orange her.



I SAW THREE SHIPS

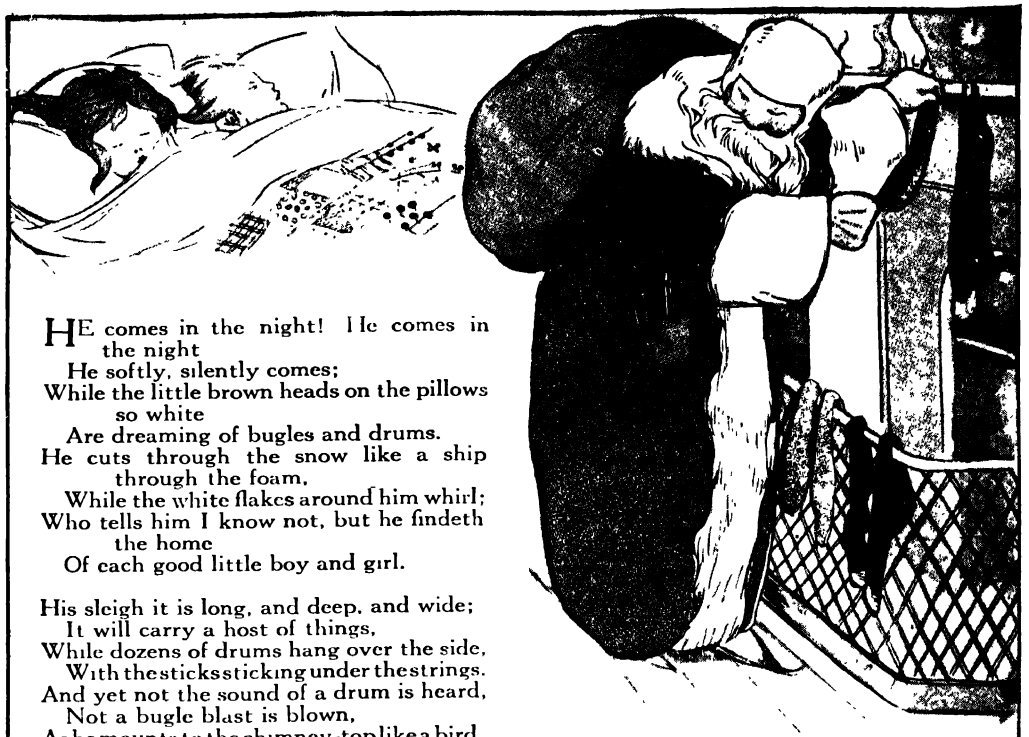
I SAW three ships come sailing by,
Sailing by, sailing by,
I saw three ships come sailing by,
On Christmas Day in the morning.

And what do you think was in them then,
In them then, in them then?
And what do you think was in them then,
On Christmas Day in the morning?

Three pretty girls were in them then,
In them then, in them then,
Three pretty girls were in them then,
On Christmas Day in the morning.

And one could whistle and one could sing,
And one could play on the violin,
Such joy there was at my wedding,
On Christmas Day in the morning.





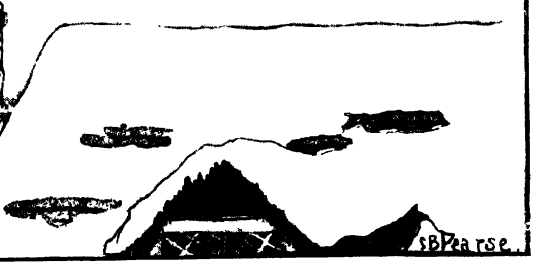
HE comes in the night! He comes in the night
He softly, silently comes;
While the little brown heads on the pillows so white
Are dreaming of bugles and drums.
He cuts through the snow like a ship through the foam,
While the white flakes around him whirl;
Who tells him I know not, but he findeth the home
Of each good little boy and girl.

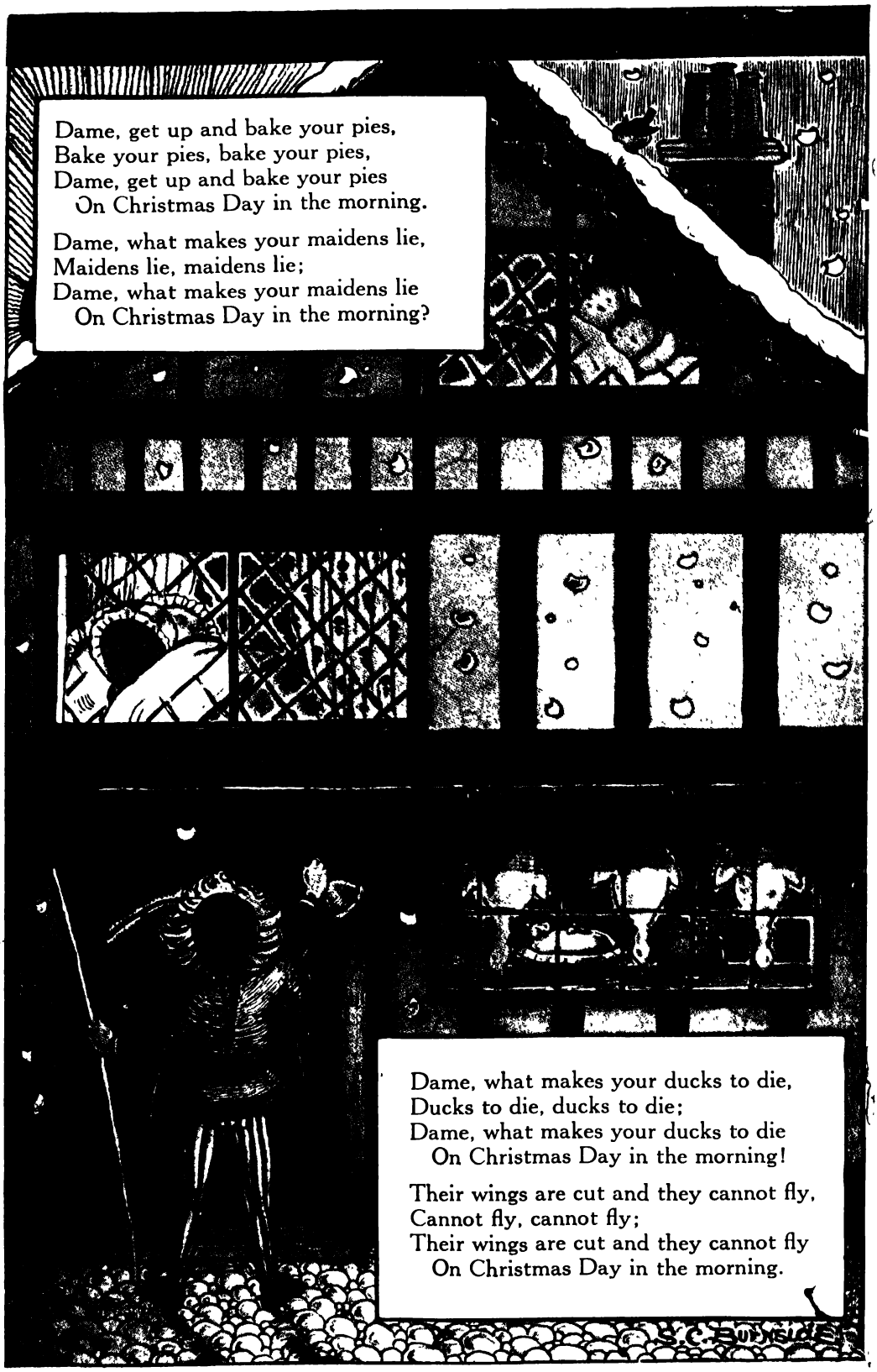
His sleigh it is long, and deep, and wide;
It will carry a host of things,
While dozens of drums hang over the side,
With the sticks sticking under the strings.
And yet not the sound of a drum is heard,
Not a bugle blast is blown,
As he mounts to the chimney-top like a bird,
And drops to the hearth like a stone.

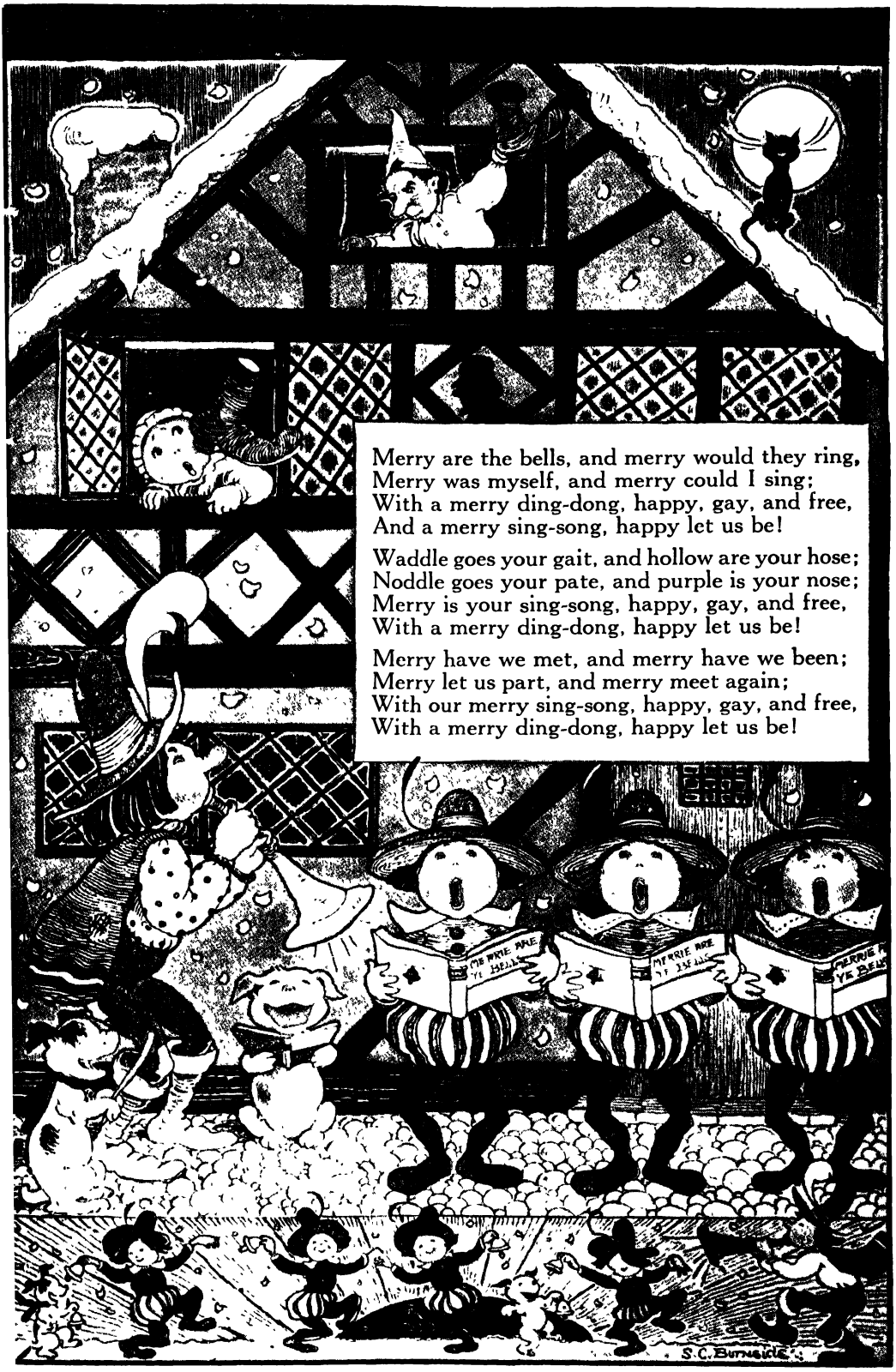


The little red stockings he silently fills
Till the stockings will hold no more;
The bright little sleds for the great snow hills
Are quickly set down on the floor.
Then Santa Claus mounts to the roof like a bird,
And glides to his seat in the sleigh;
Not the sound of a bugle or drum is heard
As he noiselessly gallops away.

He rides to the East, and he rides to the West,
Of his goodies he touches not one;
He eateth the crumbs of the Christmas feast
When the dear little folks are done.
Old Santa Claus doeth all he can,
This beautiful mission is his;
Then, children, be good to the little old man,
When you find who the little man is.




Dame, get up and bake your pies,
Bake your pies, bake your pies,
Dame, get up and bake your pies
On Christmas Day in the morning.
Dame, what makes your maidens lie,
Maidens lie, maidens lie;
Dame, what makes your maidens lie
On Christmas Day in the morning?
Dame, what makes your ducks to die,
Ducks to die, ducks to die;
Dame, what makes your ducks to die
On Christmas Day in the morning!
Their wings are cut and they cannot fly,
Cannot fly, cannot fly;
Their wings are cut and they cannot fly
On Christmas Day in the morning.


Merry are the bells, and merry would they ring,
Merry was myself, and merry could I sing;
With a merry ding-dong, happy, gay, and free,
And a merry sing-song, happy let us be!
Waddle goes your gait, and hollow are your hose;
Noddle goes your pate, and purple is your nose;
Merry is your sing-song, happy, gay, and free,
With a merry ding-dong, happy let us be!
Merry have we met, and merry have we been;
Merry let us part, and merry meet again;
With our merry sing-song, happy, gay, and free,
With a merry ding-dong, happy let us be!
S.C. Burnside

MARLEY'S GHOST APPEARING TO OLD SCROOGE



When Scrooge went home on Christmas Eve, after denouncing everything connected with Christmas, he was visited by the ghost of his late partner, who told him that if he valued his future happiness he must pay heed to what he would be shown by the spirits of Christmas who were coming to visit him.

THE STORIES OF CHARLES DICKENS

WE are now going to read together a number of the famous books of Charles Dickens, and we cannot do better than begin with one of his shorter stories. "A Christmas Carol in Prose" is only a short book written for the Christmas season, but it is one of the most charming stories Dickens ever gave us. It is quite the best Christmas story, and Dickens was the author who made stories of this kind popular. He wrote it for the Christmas of 1842, and it touched the hearts of all who read it. "It seems to me a national benefit, and to every man and woman who reads it a personal kindness," said Thackeray, the great novelist who lived at the same time as Dickens. The writer of "A Christmas Carol" is indeed the Father Christmas of literature, and so long as we celebrate the joyous season we shall remember his delightful story, which breathes the very spirit of goodwill. Mr. Harry Furniss, the famous artist, has specially illustrated this story for us.

THE OLD MAN NAMED SCROOGE

BEING A CHRISTMAS CAROL IN PROSE

CONTINUED FROM 2030

THERE was a very dreadful old man named Ebenezer Scrooge. What a fine name for a horrid old man! There never was such an old grumpy, frumpy, ill-tempered, sour, unfriendly old man. He had been in partnership for many years with one named Marley, so his firm was known as Scrooge and Marley. But Marley had been dead for seven years "as dead as a door-nail"—and Scrooge lived alone and shunned everybody.

He had a clerk in his office named Bob Cratchit, and he only paid the poor fellow who had a wife and four children—fifteen shillings a week, a wage that scarcely fed his family.

The bare, ill-furnished office that Cratchit sat in was more like a tank than a room, and it was as much as his place was worth to attempt to keep himself warm by putting on a good fire, even in the coldest weather.

Old Scrooge grudged every piece of coal that was burned, and kept the coal-box in his own room. He never gave poor Bob a holiday except on Christmas Day, and he hated the very thought of that day coming round. You really never heard of such a nasty, sour-tempered old man.

His nephew, Fred, was just the reverse—a jolly, good-natured young man, who determined that he would always wish his uncle a merry Christmas, no matter how he was snubbed by him. It was Christmas Eve, and into the office of Scrooge and Marley popped the jolly nephew, saying brightly to old Scrooge: "A merry Christmas, uncle! God save you!"

"Bah!" said Scrooge. "Humbug!"

"Christmas a humbug, uncle!" said Scrooge's nephew. "You don't mean that, I am sure."

"I do," said Scrooge. "Merry Christmas! What right have you to be merry? What reason have you to be merry? You're poor enough!"

"Come, then," returned the nephew gaily; "what right have you to be dismal? What reason have you to be morose? You're rich enough!"

Scrooge, having no better answer ready on the spur of the moment, said "Bah!" again, and followed it up with "Humbug!"

"Don't be cross, uncle!" said the nephew.

"What else can I be," returned the uncle, "when I live in such a world of fools as this? Merry Christmas! Out upon merry Christmas! What's Christmas-time to you but a time for paying bills without money; a time for finding yourself a year older, but not an hour richer; a time for balancing your books and having every item in 'em through a round

OLD FEZZIWIG'S CHRISTMAS BALL



The Ghost of Christmas Past shows Scrooge his old master Fezziwig making everybody happy at Christmas.

dozen of months presented dead against you? If I could work my will," said Scrooge indignantly, "every idiot who goes about with 'Merry Christmas' on his lips should be boiled with his own pudding, and buried with a stake of holly through his heart. He should!"

"Uncle!" pleaded the nephew.

"Nephew!" returned the uncle sternly. "Keep Christmas in your own way, and let me keep it in mine!"

"Keep it!" repeated Scrooge's nephew. "But you don't keep it!"

"Let me leave it alone, then," said Scrooge. "Much good may it do you! Much good it has ever done you!"

And so he went on, denouncing Christmas in a frightful way and refusing utterly to say a good word about it or anybody or anything, until his good-natured nephew went away. Two gentlemen who called later in the day for a subscription on behalf of the poor were, of course, turned out without a penny. There were workhouses. What more did the poor want? Old Scrooge would think himself mad to waste his money on them or on anybody, and poor Bob Cratchit was told to be in all the earlier to work on Boxing Day, as he was having Christmas Day off, which was equal to stealing so much of his employer's time. What an old skin-flint!

THE STRANGE THINGS THAT HAPPENED TO OLD SCROOGE ON CHRISTMAS EVE

Now, when the old curmudgeon went home that night to the dismal chambers he occupied—they had formerly been the rooms of his dead partner Marley—he was amazed to notice that the knocker on the door was—old Marley's face! This was queer. But the old fellow went up the dark stairs as boldly as he could, and entered his dark, dreary, dismal rooms. Darkness was cheap, and so he liked it, the old miser!

"Sitting-room, bedroom, lumber-room. All as they should be. Nobody under the table, nobody under the sofa; a small fire in the grate, spoon and basin ready, and the little saucepan of gruel upon the hob, for Scrooge had a cold in his head. Nobody under the bed; nobody in the closet; nobody in his dressing-gown, which was hanging up in a suspicious attitude against the wall. Lumber-room as usual—old fire-guard, old shoes, two fish-baskets, washing-stand on three legs, and a poker.

"Quite satisfied, he closed the door, and locked himself in—double-locked himself in, which was not his custom. Thus secured against surprize, he took off his cravat, put on his dressing-gown and slippers, and his nightcap, and sat down before the fire to take his gruel."

As he sat looking at the low fire, he suddenly realized that every tile about the grate had on it a copy of old Marley's face staring at him. He now began to feel very creepy, you may be sure.

HOW THE GHOST OF OLD MARLEY CAME TO SCROOGE AND WHAT IT TOLD HIM

There was an old bell high up in the room, and it began to ring, while a noise downstairs made him start, and the sound of someone coming to his room made him quiver in every limb, and, behold, the ghost of old Marley walked into his dismal room, with a long, heavy chain dragging from his waist.

When Scrooge summoned up courage to speak to the ghost, it told him that the chain was all the misdeeds and unkind actions of which he had been guilty, and that Scrooge himself was making a chain which would be an awful weight to him when he was dead. The ghost also told him that he would be visited by three spirits, the first coming at one o'clock in the morning; and if he valued his future peace he had better take the advice he had given him and see what the spirits would show him. But old Marley's ghost he would see no more. When it vanished Scrooge looked out of his window and saw many such phantoms with heavy chains about their waists, just as Marley had been burdened. Denouncing the whole thing as "humbug," he lay down on his bed as he was, and was soon asleep.

When he awoke it was still dark, and he had no idea of the time. But while he lay on the bed peering anxiously in the gloom, the curtains were drawn aside by a hand, and the first of the promised spirit-visitors stood before him.

THE GHOST OF CHRISTMAS PAST AND WHAT IT SHOWED THE MISER

"It was a strange figure—like a child; yet not so like a child as like an old man, viewed through some supernatural medium, which gave him the appearance of having receded from the view, and being diminished to a child's proportions. Its hair, which hung about its neck and down its back, was white, as if with age; and yet the face had not a wrinkle in it,

and the tenderest bloom was on the skin. The arms were very long and muscular; the hands the same, as if its hold were of uncommon strength. Its legs and feet, most delicately formed, were, like those upper members, bare. It wore a tunic of the purest white, and round its waist was bound a lustrous belt, the sheen of which was beautiful. It held a branch of fresh green holly in its hand, and, in singular contradiction of that wintry emblem, had its dress trimmed with summer flowers. But the strangest thing about it was that from the crown of its head there sprung a bright, clear jet of light, by which all this was visible; and which was doubtless the occasion of its using, in its duller moments, a great extinguisher for a cap, which it now held under its arm."

THE YEARS ARE ROLLED AWAY AND OLD FEZZIWIG'S BALL COMES BACK AGAIN

He told the miserly old man that he was the Ghost of Christmas Past, and before Scrooge knew it he found himself away many miles, led by the spirit, and back many weary years, seeing his own boyhood's home, as well as many happy scenes he had long forgotten, but was delighted to see again. He was shown some jolly Christmases of long ago, when he was a youth; and, best of all, the spirit took him to the warehouse where he had been an apprentice. When they peeped in Scrooge cried out, on seeing an old gentleman in a Welsh wig, sitting at a high desk:

"Why, it's old Fezziwig! Bless his heart, it's Fezziwig alive again!"

"Old Fezziwig laid down his pen, and looked up at the clock, which pointed to the hour of seven. He rubbed his hands, adjusted his capacious waistcoat, laughed all over himself, from his shoes to his organ of benevolence, and called out in a comfortable, oily, rich, fat, jovial voice:

"'Yo ho, there! Ebenezer! Dick!'

OLD SCROOGE SEES HIMSELF AGAIN AS A HAPPY YOUNG MAN IN THE LONG-AGO

"Scrooge's former self, now grown a young man, came briskly in, accompanied by his fellow-'prentice.

"'Dick Wilkins, to be sure!' said Scrooge to the ghost. 'Bless me, yes. There he is. He was very much attached to me, was Dick. Poor Dick! Dear, dear!'

"'Yo ho, my boys!' said Fezziwig. 'No more work to-night. Christmas Eve, Dick! Christmas, Ebenezer! Let's have the shutters up,' cried old Fezziwig, with a sharp clap of his hands, 'before a man can say Jack Robinson!'

"You wouldn't believe how those two fellows went at it. They charged into the street with the shutters (one, two, three), had 'em up in their places (four, five, six), barred 'em and pinned 'em (seven, eight, nine), and came back before you could have got to twelve, panting like race-horses.

"'Hilli-ho!' cried old Fezziwig, skipping down from the high desk with wonderful agility. 'Clear away, my boys—lads, and let's have lots of room here! Hilli-ho, Dick! Chirrup, Ebenezer!'

"Clear away! There was nothing that they wouldn't have cleared away, or couldn't have cleared away, with old Fezziwig looking on. It was done in a minute. Every movable was packed off, as if it were dismissed from public life for evermore. The floor was swept and watered, the lamps were trimmed, fuel was heaped upon the fire, and the warehouse was as snug and warm and dry and bright a ball-room as you would desire to see upon a winter's night.

THE MERRIEST, JOLLIEST CHRISTMAS PARTY THAT EVER WAS!

"In came a fiddler with a music-book, and went up to the lofty desk and made an orchestra of it, and tuned like fifty stomach-aches. In came Mrs. Fezziwig, one vast substantial smile. In came the three Miss Fezziwigs, beaming and lovable. In came the six young followers whose hearts they broke. In came all the young men and women employed in the business. In came the housemaid, with her cousin, the baker. In came the cook, with her brother's particular friend, the milkman. In came the boy from over the way, who was suspected of not having board enough from his master, trying to hide himself behind the girl from next door but one, who was proved to have had her ears pulled by her mistress. In they all came, one after another—some shyly, some boldly, some gracefully, some awkwardly, some pushing, some pulling. In they all came, anyhow and everyhow.

"Away they all went, twenty couples at once; hands half round and back again the other way; down the middle and up again; round and round in

various stages of affectionate grouping; old top couple always turning up in the wrong place; new top couple starting off again as soon as they got there; all top couples at last, and not a bottom one to help them. When this result was brought about, old Fezziwig, clapping his hands to stop the dance, cried out, 'Well done!' and the fiddler plunged his hot face into a pot of porter, especially provided for that purpose. But, scorning rest, upon his reappearance he instantly began again, though there were



THE MERRY CHRISTMAS DINNER AT THE HOME OF POOR BOB CRATCHIT

no dancers yet, as if the other fiddler had been carried home, exhausted, on a shutter, and he were a bran-new man resolved to beat him out of sight, or perish."

And so the jolly party went on until eleven o'clock, when Fezziwig and his wife wished them all a merry Christmas and parted from them as happy as happy could be. Scrooge was so delighted that he began to wish he could meet Bob Cratchit at once; he would not be so rough with him now. But the ghost took him to another Christmas, when old Marley was lying at death's door and Scrooge was lonely in his office, while happiness was reigning in the home of an old sweetheart of his, who had fortunately married a kindly, good-natured man. There's no saying what else the Ghost of Christmas Past would have shown him had Scrooge not managed to get the extinguisher in his hand, which the ghost had carried all the time, and, by pressing this down upon it, to put out the light of the ghost like a snuffed candle. And he had barely time to reel into bed before he fell into a heavy sleep.

When he awoke again it was still dark outside, but his room was filled with a mysterious ruddy light. The bell struck one. No ghost appeared. Scrooge was trembling with fear. After a while he ventured to get up, and shuffled in his slippers to the door.

"The moment Scrooge's hand was on the lock a strange voice called him by his name, and bade him enter. He obeyed. It was his own room. There

was no doubt about that. But it had undergone a surprizing transformation. The walls and ceiling were so hung with living green that it looked a perfect grove, from every part of which bright, gleaming berries glistened.

THE JOLLY GIANT WHO WAS THE GHOST OF CHRISTMAS PRESENT

"The crisp leaves of holly, mistletoe, and ivy reflected back the light, as if so many little mirrors had been scattered there; and such a mighty blaze went roaring up the chimney as that dull hearth had never known in Scrooge's time, or Marley's, or for many and many a winter season gone. Heaped up on the floor, to form a kind of throne, were turkeys, geese, game, poultry, brawn, great joints of meat, sucking-pigs, long wreaths of sausages, mince-pies, plum-puddings, barrels of oysters, red-hot chestnuts, cherry-cheeked apples, juicy oranges, and seething bowls of punch, that made the chamber dim with their delicious steam. In easy state upon this couch there sat a jolly giant, glorious to see, who bore a glowing torch, in shape not unlike Plenty's horn, and held it up, high up, to shed its light on Scrooge, as he came peeping round the door.

"'Come in!' exclaimed the ghost. 'Come in and know me better, man!'

"Scrooge entered timidly, and hung his head before this spirit. He was not the dogged Scrooge he had been, and though the spirit's eyes were clear and kind, he did not like to meet them.

"'I am the Ghost of Christmas Present,' said the spirit. 'Look upon me!'"

HOW THE GHOST TOOK OLD SCROOGE TO THE HOME OF BOB CRATCHIT

This jolly ghost took shivering old Scrooge away on the wings of the wind through the Christmas streets, showed him the home of poor Bob Cratchit, where, with all their poverty, his clerk and his wife and children were happy and delighted around the Christmas goose, and the great steaming plum-pudding, which Mrs. Cratchit had saved for so long and cooked so carefully. And after the dinner was over Bob proposed the toast: "A merry Christmas to us all, my dears; God bless us!" which Mrs. Cratchit, Peter, Belinda, and Martha all echoed, while Tiny Tim said last of all, "God bless us every one!"

Tim was Cratchit's youngest child, a little cripple whose life seemed to hang only by a thread, he was so weak and tiny. Scrooge, who had cruelly said that the death of such children was a good riddance, was now anxious to know if there was any hope for Tiny Tim. He was almost as concerned about him now as if he had been his own child.

But the spirit whirled him on through a colliery village, where poor folk were rejoicing around Christmas fires; to a lighthouse in the stormy sea, where lonely men still wished each other a happy Christmas; to the home of his nephew, Fred, where everything was happiness, and even his own name was spoken not with contempt, but with sorrow and sympathy, because he was not enjoying the season of goodwill.

To many other homes and places the Ghost of Christmas Present took him, showing him misery and want as well as happiness and plenty. But as the bells struck twelve the spirit vanished, and a new and different figure came to him. This was the third and last of his strange, ghostly visitors.

THE APPEARANCE OF THE GHOST OF CHRISTMAS YET TO COME

"I am in the presence of the Ghost of Christmas Yet To Come?" said Scrooge. The spirit answered not, but pointed onward with its hand. "You are about to show me shadows of the things that have not happened, but will happen in the time before us," Scrooge pursued. "Is that so, Spirit?" The upper portion of the garment was contracted for an instant in its folds, as if the spirit had inclined its head. That was the only answer he received.

The mission of this spirit was soon begun, for it showed him his own death and how not a soul was there to mourn his loss; how his death was rather a cause of happiness in some quarters than a sense of loss; but it also showed him how Tiny Tim might die and leave many friends to sorrow for him, because they had loved him, while his memory would endure in their hearts.

In short, old Scrooge had now come to be so affected by all the visions which the three spirits had shown him that he was utterly changed, and when at length the Ghost of Christmas Yet To Come brought him to a neglected gravestone with his own name on it, he was no longer the Scrooge that had

turned his nephew out of his office without wishing him a merry Christmas. He appealed to his spirit-guide for mercy, and promised to alter his life in the future.

"'I will honor Christmas in my heart, and try to keep it all the year. I will live in the Past, the Present, and the Future. The spirit of all three shall strive within me. I will not shut out the lessons that they teach. Oh, tell me I may sponge away the writing on this stone!' In his agony he caught the spectral hand. It sought to free itself, but he was stronger in his entreaty, and detained it. The spirit, stronger yet, repulsed him. Holding up his hands in a last prayer to have his fate reversed, he saw an alteration in the phantom's hood and dress. It shrunk, collapsed, and dwindled down into a bedpost."

Great was Scrooge's delight when he awoke to find it was Christmas Day, and that he was not too late to begin at once. Never did a jollier old gentleman set out to make people happy on Christmas Day. He sent the biggest prize turkey that ever was sold to Bob Cratchit's—sent it in a cab, if you please, to be in time. He met one of the gentlemen who had called for the subscription for the poor, and gave him so big a donation that the gentleman was amazed. "A great many back payments included in it," old Scrooge explained to him. He hied himself to the home of his nephew, and staggered Fred and his wife and her sister and all the others who came to the Christmas party by being the jolliest of the lot. "Wonderful party, wonderful games, wonderful unanimity, won-der-ful happiness!"

He went early next morning to his office. Bob Cratchit was late. Scrooge pretended to be very angry with him for a little, and then playfully dug him in the ribs and said that, as a punishment, he was going to raise his salary!

"A merry Christmas, Bob!" said Scrooge, with an earnestness that could not be mistaken, as he clapped him on the back. "A merrier Christmas, Bob, my good fellow than I have given you for many a year! I'll raise your salary, and endeavor to assist your struggling family, and we will discuss your affairs this very afternoon over a Christmas bowl of smoking bishop, Bob! Make up the fires, and buy another coal-scuttle before you dot another i, Bob Cratchit!"

Scrooge was better than his word. He did it all, and infinitely more; and to Tiny Tim, who did NOT die, he was a second father.

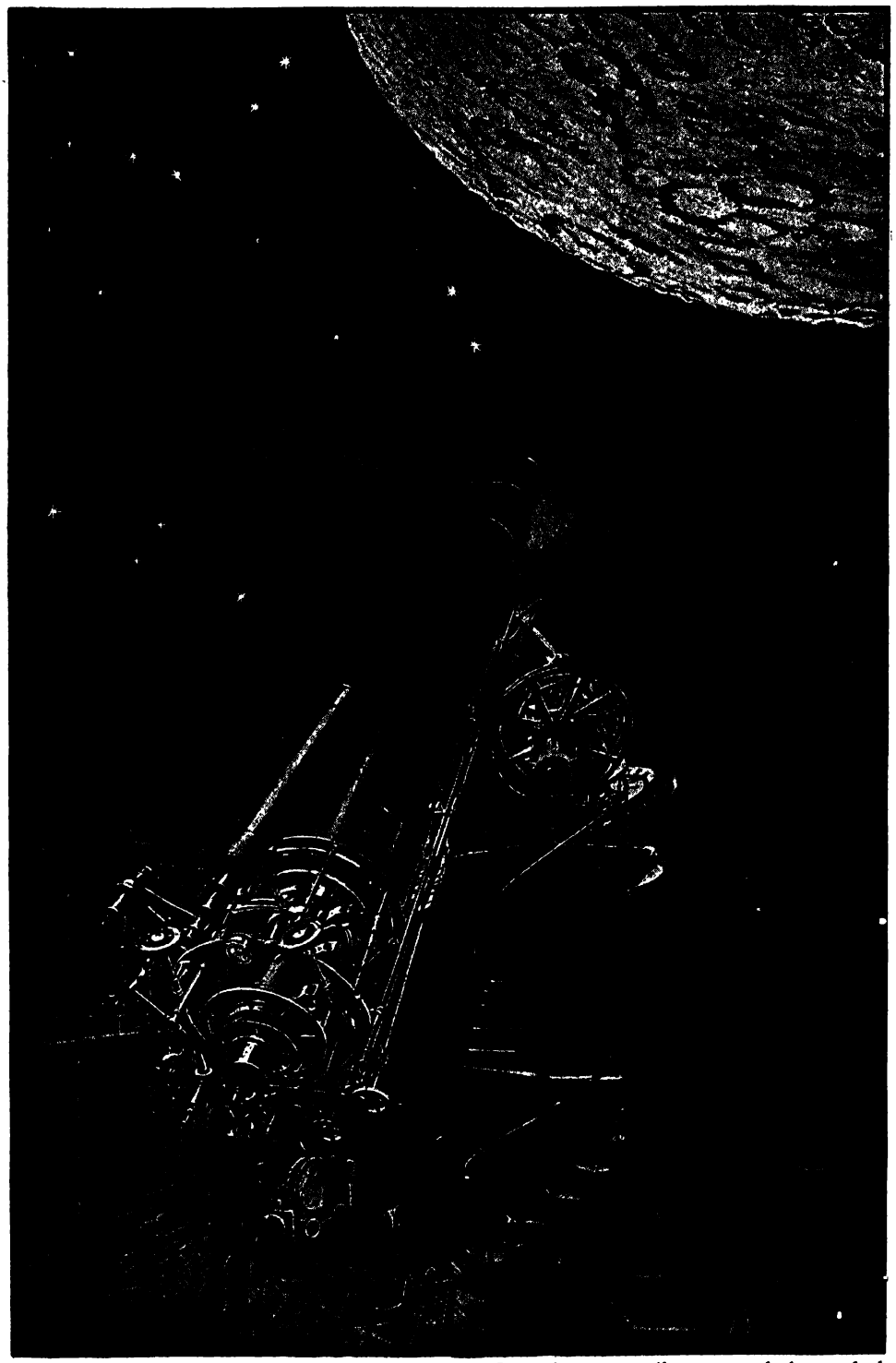
HOW OLD SCROOGE SURPRIZED BOB CRATCHIT



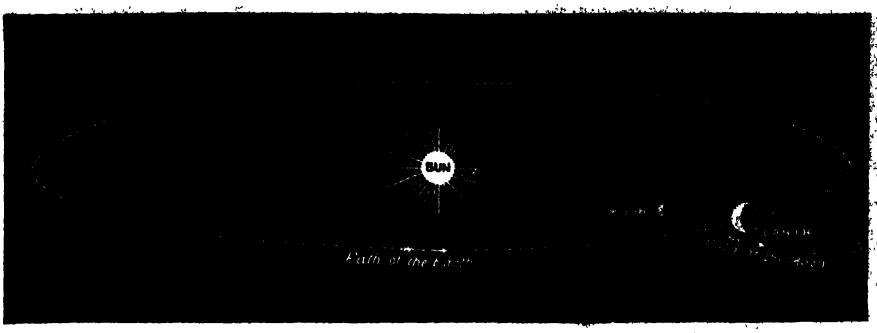
After Scrooge, the miser, had been visited by the spirits of Christmas, and changed from a miserly into a kind-hearted old man, he went to his office on Boxing Day and, pretending to be angry with his clerk, Bob Cratchit, for coming in late, he dug him playfully in the ribs, saying he would punish him by raising his wages!

THE NEXT STORIES OF FAMOUS BOOKS ARE ON 2222.

LOOKING AT ANOTHER WORLD



Of all the worlds in the sky, the moon is the nearest to us. It is only 240,000 miles away, and when we look at it through a huge telescope, the moon seems to come down quite close and appear as near as does the small section in this picture. So large is the moon through a big telescope that we can study only a small part at a time, and we are able to make a more complete map of the moon than we can of some parts of the earth.



THE MOON, THE LAMP OF NIGHT

CONTINUED FROM 2094

FOR many millions of years past, certainly not less than fifty millions, the earth has been attended by a *satellite*—which means attendant—called the moon. In all ages men have admired the moon, and in the history of almost all nations there are records that the moon has actually been worshipped. It is, of course, the most brilliant body in the whole heavens, after the sun, so far as our view of things is concerned; and, just as the sun is the king of day, so the moon is the queen of night, and on account of her beauty has been celebrated by thousands of poets. The whiteness of the moon's light has always been for poets an emblem of purity, though this light, as we know, is not made by the moon, but is merely reflected sunlight.

The time has gone when men thought that everything in the world existed only for their use, nor do we now credit the moon with the power of causing lunacy, which really means *moon*-acy. But we know that the moon has very important influences upon the earth. The most obvious of these influences is the light which the moon sends us, which at night may sometimes be quite useful. We have already seen how little of the sun's light the earth catches, and the moon, being smaller than the earth, catches much less. It has been reckoned that it would require 600,000 full moons, all shining together, to light the earth as brilliantly as the sun lights it now.

The sun is always shining, and the side of the moon which is exposed to it is always lit by it, except for a few minutes now and again, when the earth gets between the sun and the moon. The proof of the fact that the moon gives out no light of its own is to be found in the changes that the moon goes through every month. These changes, which we are all more or less familiar with, can only have one meaning—which is, that all the light we see the moon by is reflected sunlight; and if the sun's light upon the moon is lighting the half which is away from our eyes, then we see no moon at all.

The only exception to this is that sometimes we can see what people call "the old moon in the young moon's arms." We see, perhaps, a beautiful bright crescent, and then the rest of the moon very faintly shown. The bright crescent we see by reflected sunlight, and the rest of the moon's face by reflected earth-light. This is one of the facts which prove that the earth, seen from somewhere else, would look bright. It reflects sunlight enough, indeed, to light up the face of the moon at times sufficiently for us to see it by.

The brightness of the moon depends on its nearness. In all the heavens there are only a very few bodies that we can see smaller than the moon, but the moon has the great advantage of being very much nearer us than

anything else. Its distance from the earth is only about 240,000 miles—less than ten times the distance round the earth. Compared with the distance of the sun or of Mars, this is, of course, very small indeed. It gives us the great advantage that we can study the moon with our telescopes more closely than any other body in the heavens.

WHY THE MOON COOLED DOWN AND DIED SO QUICKLY

The moon, however, is very tiny, and the whole face of it, which we see, is only about twice the size of Europe. If you look at Europe on the map of the earth, you will see that that does not amount to much. The distance through the moon, or its diameter, is only a little more than a quarter that of the earth, and "if the earth were cut into fifty pieces, all equally large, then one of these pieces rolled into a globe would equal the size of the moon." But the surface of the moon is about one-thirteenth that of the earth. These figures are extremely important and interesting. They show us that when the moon is compared with the earth, it has a far bigger surface in proportion to its size. It is only one-fiftieth of the size, but instead of having a surface only one-fiftieth the size of the earth's, its surface is one-thirteenth that of the earth. That is why the moon has cooled so very much more quickly than the earth has done, and this rapid cooling of the moon accounts for two things: first, its cold and lifeless state to-day; and second, the character of the moon's surface, which shows that its life, so to speak, was "a short and merry one." The cooling crust of the moon shrank down upon its interior so quickly that the most violent things happened, the marks of which have been left long ages afterwards on the surface of the moon for us to study.

THE SIDE OF THE MOON THAT MEN HAVE NEVER SEEN

The fact that the distance across the moon looks to us always much the same shows that the moon's distance from the earth varies very little, and that is so. The reason is, of course, that the moon travels round the earth in a path which is very nearly, but not quite, a circle. It moves once round the earth in about twenty-seven days and a third. This time makes the real month, which we call the lunar month. There are twelve months in the year according to the calendar, but that has only been made so for convenience. Really there are thirteen and a little bit more; in other words, while the earth goes round the sun once, the moon goes round the earth a little over thirteen times.

But, as the moon goes round the earth, we find that she keeps the same side towards us. Indeed, we have never seen, and never can see, more than one half of the moon's surface, or just a trifle more than half. The reason is that the moon is slowly spinning upon itself as it moves round the earth, and it makes one complete spin on itself in just the same time as it takes to go once round the earth. In other words, the moon's 24-hour day is a month long.

Anyone living upon the moon, then, would have day and night as we have day and night upon the earth, and for the same reason—because the moon is spinning. But, as the moon's spin is very slow, the bright part of his day would last about one of our fortnights, and the dark part of it, corresponding to our night, would last another fortnight.

A WORLD THAT WE KNOW BETTER THAN WE KNOW AFRICA

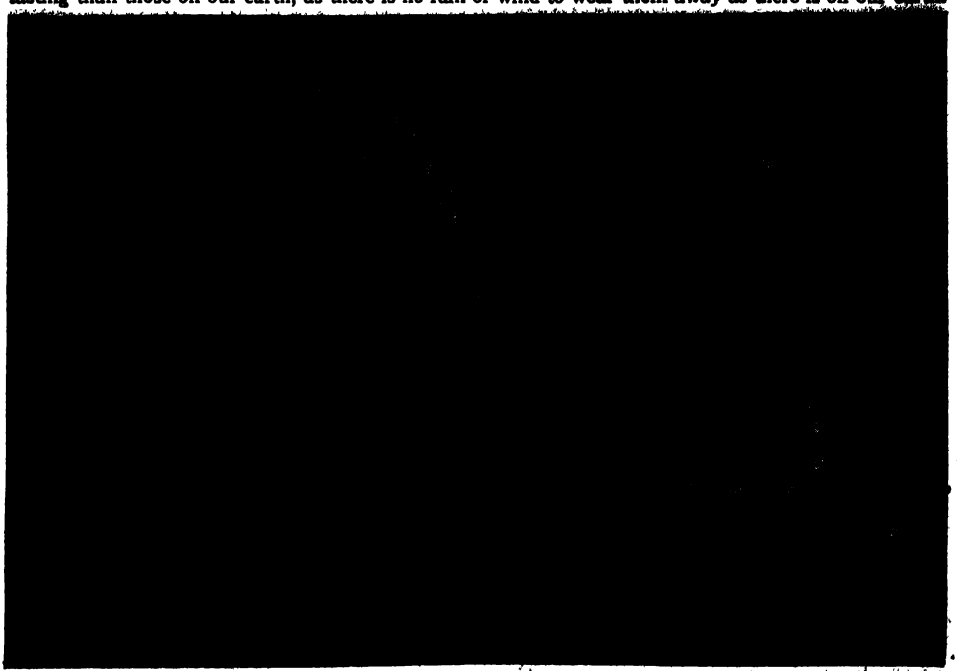
Of course, we should like to see the other side of the moon, but we may be quite sure that if we could it would be very much the same as the side we can see. We have now mapped out the visible half of the moon very carefully with drawings and photographs. As Sir Robert Ball has said, "astronomers know the surface of the moon better than geographers know the interior of Africa. Every spot on the face of the moon which is as large as an English parish has been mapped, and all the more important objects have been named." This, we must remember, however, applies only to one-half of the moon's surface. Of the other we know nothing. When we look at a map of the moon, or when we look at the moon through a telescope, we do not see at all anything like the face we all know so well, but we see at once what it was that made the appearance of a face.

The moon's surface is richly covered with markings, the largest of which are great dark spaces, which are the markings we see with our naked eyes. These spaces, though they contain no water,

WHAT IT IS LIKE ON THE MOON



The surface of the moon is covered with markings, the clearest of which are those great dark spaces or plains which we can see with our naked eyes. Through a telescope, however, we can see the great mountain ranges and large craters of extinct volcanoes like those shown in this picture, which is a photograph of a model made by a great astronomer to show what the surface of the moon is like. These mountains are more lasting than those on our earth, as there is no rain or wind to wear them away as there is on our earth.



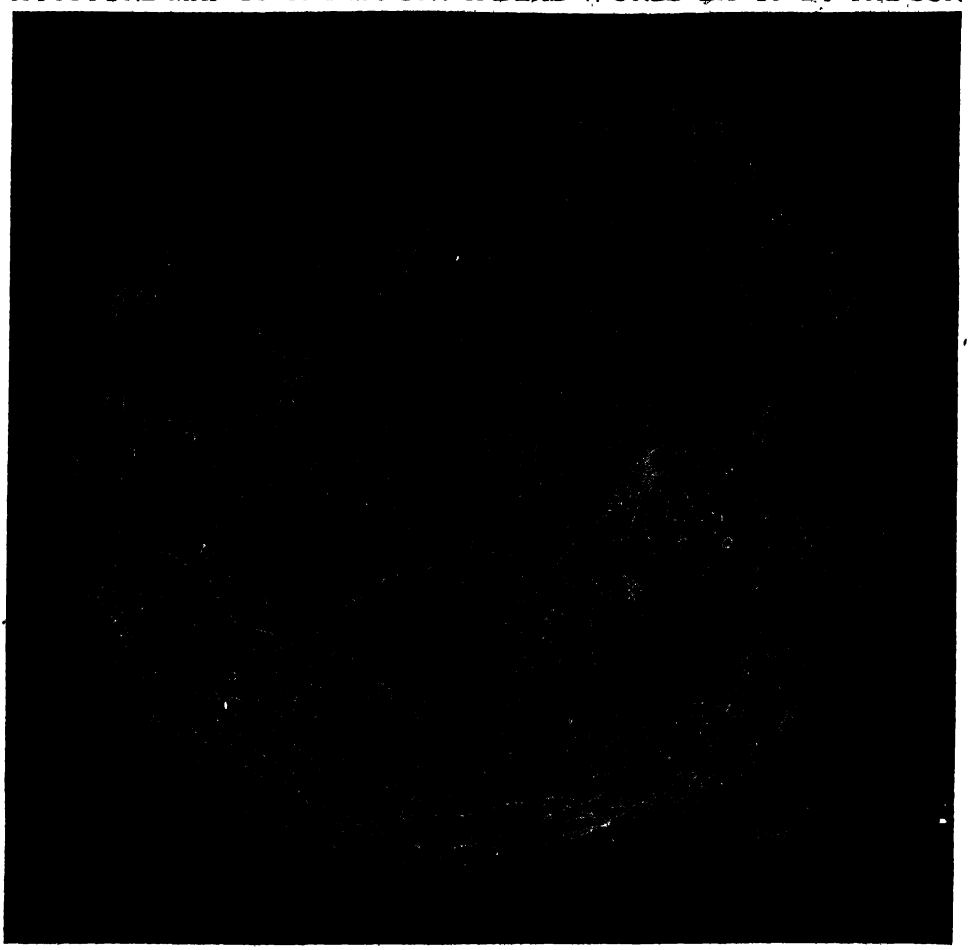
This is a photograph of the part of the moon near the volcano called Plato. The dark oval is the crater of this mountain, and measures at its widest not more than fifty miles across. The walls of this crater, the black shadows of which can be seen on the left of the oval, are in some parts as high as 3,600 feet. At the top of this view on the left we can see a groove or valley supposed by some to have been cut by a huge aerolite passing over the surface, and by others to have been made by an earthquake ages ago.

were called "seas" by the old astronomers. We also see great ridges, which are mountain ranges, and large rings, which are the remains of volcanoes.

There can be no question that many of the things we see project from the surface of the moon, and that they are lit from something outside them, for we can see their great shadows. When the moon is quite full, and the sun is striking directly upon it, these shadows are absent, and, indeed, though the moon is then beautiful to the naked eye, the astronomer cannot learn from it nearly so much as he can at other times. If we want to see a lunar mountain at its best, we must watch it when it is not far from the edge between light and darkness. The sun's rays are then falling upon it slantwise, and we can see its form, the shadows it throws, and learn its size from them.

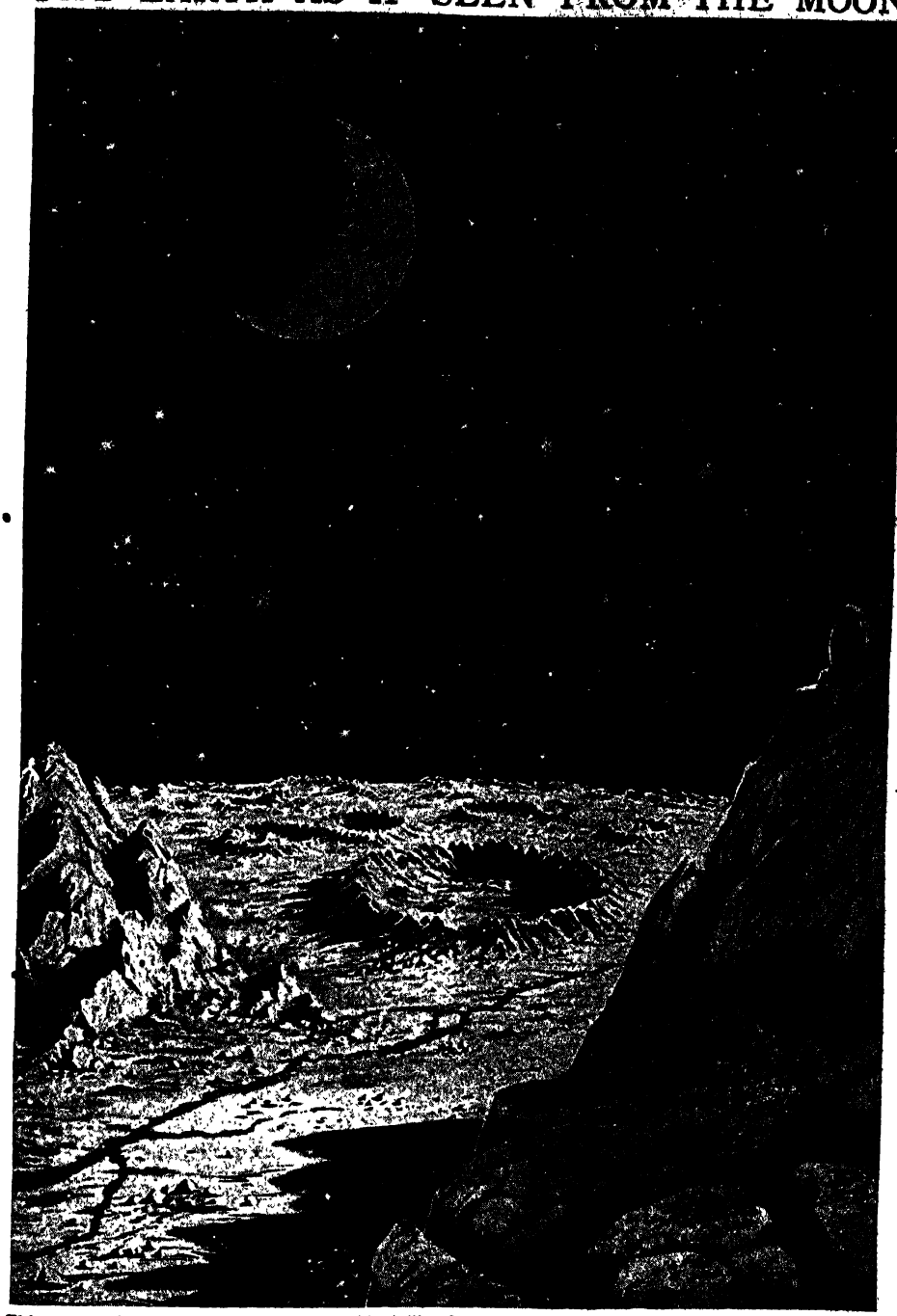
The shadows thrown by the mountains of the moon are extremely brilliant and sharp. The reason is that the moon has no air. The shadows thrown on the earth are neither so black nor so sharp as they would be if there were no air, for the air spreads the light about, and throws a certain amount even upon the blackest part of the blackest shadow. Now, it is not difficult in the case of the earth to find out how high a thing is if we can measure the length of its

A PICTURE-MAP OF THE MOON: A DEAD WORLD LIT UP BY THE SUN



This is a picture-map of the moon, which is really a dead world, as the earth would be if there were not one living thing upon it. The moon travels round the earth as the earth travels round the sun. It is not light in itself; what we see is the light of the sun upon it, like the light of a candle thrown upon a wall. We see really one half of an enormous globe, like a small earth, lit up in the sunshine, spinning in space like a fire-ball, yet weighing millions of tons. The little map shows how much bigger than Great Britain the moon is.

THE EARTH AS IF SEEN FROM THE MOON



This picture shows us what the earth would look like if we could see it from the moon. The light of the sun falling upon the earth must make it shine like the moon when seen, if it is seen, from other planets. We do not know if there are any inhabitants of the universe who see our earth like this, but if so they must be utterly different from ourselves. No beings dependent upon air for their life could live on the moon, for the moon is an airless world. People on the moon could not speak, because there is no sound without air; the largest cannon-ball that could be fired, if it could be made to reach the moon, would fall like a pin upon velvet. The moon might be filled with lovely flowers, but they would give off no scent; many birds might sing, but not a note would be heard. For the moon is a silent world, where sound, and speech, and smell cannot exist.

shadow. We should do this at noonday, when the sun is highest in the sky, and then, if we know how high the sun was on the day in question, we can calculate from the length of the shadow what the height of the object is. Indeed, if we make the measurement on certain days in the year, the length of the shadow is the same as the height of the thing we are measuring. It is not a very difficult matter to find out the number of miles that a shadow on the moon extends, and we can also find out how high the sun would appear to anyone looking at it from that part of the moon. So we can measure the height of mountain peaks and of crater edges in the moon. We find craters fifty, sixty, and more miles wide. Some of these have walls of the most tremendous height—10,000 feet, for instance. In other places, instead of a deep crater, we find a great plain, perhaps with a mountain peak in its centre, perhaps not. One of the most splendid of these craters is named after Copernicus, and many other astronomers have had their names given to the larger craters that scar the surface of the moon.

THINGS THAT HAPPENED BEFORE THERE WERE HUMAN BEINGS ON THE EARTH

According to many astronomers, there are still occasional traces of things going on upon the moon. For instance, we believe that a small crater has been found that was not there before. However, even if there were no doubt that small changes still occur on the surface of the moon, we are certain that nothing which now occurs there can compare for a moment with the tremendous events which created the moon's surface as we now see it. So far as we can judge, these events must have occurred not merely long before there were any human beings upon the earth to witness them, but at a time when the earth was so hot that no life of any kind upon its surface had yet become possible.

In any case, the facts of the moon's surface clearly show quite what we should expect when we remember how quickly a small body cools compared with a large one. There is one crater upon the moon which is all but eighty miles across, and the moon's craters and mountains are not to be found here and there merely, but cover it almost everywhere. Indeed, we require some other explanation of the reason why such tremendous heapings up of matter have been possible upon the moon, and that explanation is again to be found in the moon's small size.

A MAN ON THE MOON COULD JUMP ACROSS THE STREET

The force of gravitation on the moon's surface is very different from the force of gravitation on the earth's surface. It is only one-sixth as great. A man who on the earth can jump six feet high, as some can, could jump thirty-six feet high on the moon. This means that the explosive force of the volcanoes on the moon, hurling upwards all the substances which reached them from the interior of the moon, would be resisted by a feebler force of gravitation, so much less than we are familiar with on the earth that we can begin to understand how some of the great features of the moon's surface can have been formed.

All the features of the moon's surface depend upon volcanic action and the effects of the moon's rapid shrinkage. The case is very different on the earth, where air, wind, and water account between them for a great part of what happens and has happened. Our study of the earth has already shown us how vastly important air and water are in changing its surface. In the case of the moon, there is a world without air and water. Thus, Sir Robert Ball has said:

"It seems probable that a building on the moon would remain for century after century just as it was left by the builders. There need be no glass in the windows, for there is no wind and no rain to keep out. There need not be fireplaces in the rooms, for fuel cannot burn without air. Dwellers in a lunar city would find that no dust could rise, no odors be perceived, no sounds be heard."

WHY THERE ARE NO SUCH CHANGES ON THE MOON AS ON THE EARTH

Air and water, as we know, are always smoothing away the prominences on the earth, rubbing them down and rounding their edges; but when a great mass of lava was thrown up by a volcano on the moon, and hardened as it cooled, it took a shape which ages could not change, for there was nothing to cause the change. There is only one fact about the moon which can contribute much to any changes upon its surface

now. As the moon has no blanket of air, it is very much exposed to the rays of the sun. During the moon's day, which is as long as 14 of our days, the surface may become intensely hot, but during the moon's night, which is as long as 14 of our nights, there is nothing to keep in the heat which it has received during the day, so that heat is radiated freely outwards, and the moon must become colder than any part of the earth ever is. So, the surface of the moon must shrink very much with cold and expand with heat each night and day.

WHEN THE EARTH AND THE MOON WERE ONE, AND THE DAY WAS 4 HOURS LONG

We cannot doubt that the matter making the moon was once part of the earth. The proof of this cannot be explained unless we have first made a long study of mathematics. But it has been shown, especially by Sir George Darwin, son of the great Charles Darwin, that the moon must now be getting more distant from the earth, and must have been much nearer the earth once than it is to-day. We shall see, indeed, that the moon, when close to the earth, must have traveled round at the same rate as the earth rotated on herself. The earth's day was then four hours, and the month would be the same, because, of course, the month is made by the time the moon takes to go round the earth. This means that the earth and the moon moved together as if there were a bar between them, or as if they were one body, as they must once have been. Of course, we are thinking of an earth very different from the earth of to-day—certainly an earth with a liquid surface. On such an earth tides must have been caused by the sun, as it rotated at this great speed of once round in four hours, and if a great tidal wave of liquid earth were thrown off, as a drop may be thrown from a twisting umbrella, that might account for the origin of the moon.

THE PATH OF THE MOON ROUND THE EARTH

That is all we can say now about this very difficult but very interesting question. If it were true that this was the origin of the moon, we should expect to find the moon spinning upon itself and revolving round the earth, in the same direction as the earth spins round itself and revolves round the sun; and so we do. But the path of the moon round the earth is not quite on the same level, or in the same plane, as astronomers say, as the path of the earth round the sun. In a picture on a flat page—like, for instance, one of the pictures shown here—it looks as if the moon were traveling round the earth on the same level as the earth is traveling round the sun. If this were so, of course we could not see a full moon, for then the earth would be in the way of the sun's light, and instead of a full moon we should have an eclipse of the moon every month. Also the moon would eclipse the sun every month. But if we think of the moon's path round the earth as being tilted a little at an angle to the earth's path round the sun, we shall understand how it is that we are able to see a full moon, and we shall also understand that, at certain regular intervals, when the path in which the moon moves crosses the path in which the earth moves, there may be an eclipse.

WHAT THE EARTH WOULD LOOK LIKE TO A MAN IN THE MOON

If intelligent beings lived upon the moon, our earth would appear to them a most magnificent object, looking in the sky many times larger than the moon does to us, equally bright as a whole, but often hidden partly by clouds, as the moon never is. This large earth would eclipse the sun, but the size of the earth as seen from the moon would be very much larger than that of the sun, and so an eclipse of the sun by the earth, as seen from the moon, would blot out not only the body of the sun, but also its prominences and the corona, and would only leave all round a faint glow of light.

Astronomers could not learn nearly so much about the sun from the moon's surface as we can from the earth's surface, as the apparent size of the moon seen from the earth is just right for the astronomer's purpose. The relative distances of the moon and the sun vary a little at different eclipses. Sometimes the disk of the moon is a little too small to blot out the whole of the body of the sun, and then we can see a ring of sunlight all round the edge of the moon.

THE NEXT PART OF THIS IS ON PAGE 2293

BIRDS OF STREETS, TREES, AND STREAMS



The sparrow goes everywhere and eats anything. With his perky, confident ways he cheers many a slum where no other bird could live, and thrives where daintier birds would die. In the country he has few friends.



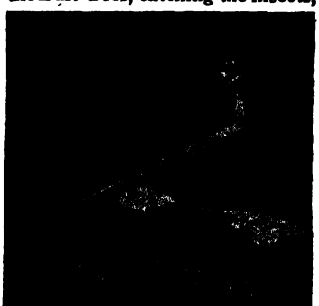
The cole-tits are members of a popular family to be found in most parts of the Old World and the New. The long-tailed tit is the famous builder of the family.



The spotted flycatcher goes to England from Africa in May and hatches its young in June. It builds a neat nest and hides it with lichen and spiders' webs.



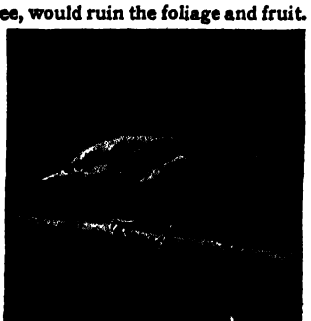
The blue titmouse is an untiring friend of the farmer. With its strong little claws it runs like a mouse over the fruit-trees, catching the insects, which, if allowed to remain on the tree, would ruin the foliage and fruit.



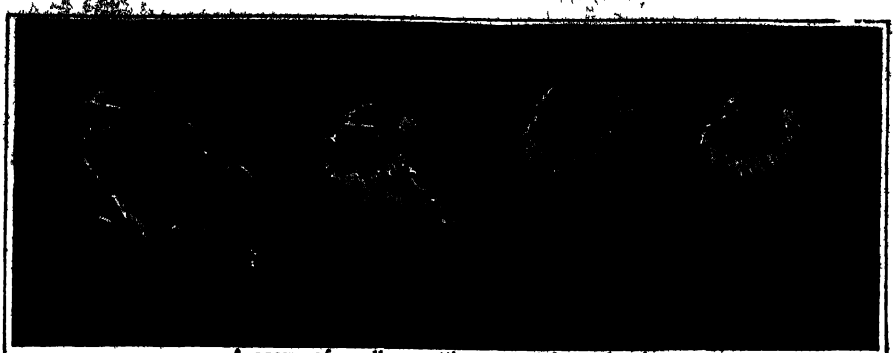
There are nine species of wagtails. They catch insects and minnows.



The great tit eats insects, but his strong beak can kill small birds.



The nuthatch climbs like a woodpecker and digs insects out of trees.



A group of swallows sitting on a telegraph wire

FAMILIAR BIRD FRIENDS

CONTINUED FROM 2114

WE come now to our last story about the birds, passing next to a trip into the lakes and rivers, and into the depths of the sea, returning afterwards to land to study some of the marvels of the insect world. We shall all miss from the story of the birds some of the friends in feathers in which we are interested. In a series of short stories like these it is impossible to deal with all the enormous number of birds that exist. All that we can hope to do is to spend pleasant hours in studying a little of the ways of birds whose lives and habits are interesting to the greatest number. Our stories serve as an introduction to the world of animal life; no stories can do more than that.

In speaking of common birds we have to deal with birds which ought to be common in our own land. Unfortunately, as we have so often seen in previous stories, the birds which should be among those most abundant are getting more and more uncommon, owing to the ruthless cruelty with which they are being destroyed.

One which becomes every year more scarce is our handsome, saucy friend the jay—a feathered prince of our woodlands in many parts of the country. There is no mistaking it for any other bird, for the jay is a big bird, nearly a foot in length from the beak to the tip of the tail, and with his tall crest and the bright blue and white plumage, and his loud, joyous, laughing call, he is quite a notable figure. If we fail to see him, he will make us know of his presence. With a loud, screaming squawk, he flutters off, arousing by his cry all the birds in the neighborhood to the fact that one of those dreadful two-legged creatures which have clothes instead of feathers is on the prowl. As a destroyer of insects the jay is a blessing to the farmer. But he is such a hungry fellow that insects do not satisfy him. He must have the choicest fruit in the orchard, and should the eggs of song-birds or game-birds, or even young birds themselves, appear in his neighborhood, the jay will have them. He is a member of the crow family, hence his hearty appetite.

Now, because he takes an egg or two, or even a bird or so, in the course of the year, farmers hunt the jay without mercy. They care nothing for the enormous good he does in cleansing crops of their burden of caterpillars.

There is another fact in favor of the blue-jay of which the farmer takes no account. This bird loves acorns. The scientific name of one species means noisy acorn lover. When the acorns are ripe, the jay carries them from the oak-tree with a view to hiding them as a winter store. Some he does hide, others he drops because he is so ill-mannered

as to talk with his mouth full. Anyhow, from those acorns which jays and other birds have buried and forgotten, many of our oak-trees have sprung. From an acorn an oak-tree will grow, and in due season it will yield thousands of other acorns, which other jays may take and hide for other oak-trees to grow from.

HOW THE BIRDS CARRY SEEDS OVER THE OCEAN, AND PLANT BARREN ISLANDS

That brings us to a remarkable feature in the life-story of the birds. Men reap harvests which the birds have sown. Barren islands have been clothed with verdure from seeds which the birds have carried. Birds do not deliberately set forth upon a journey with a view to sowing seeds. In their annual migrations from country to country they carry with them seeds from land to land. The fruit that they eat contains seed which, when liberated, will grow. It will not grow, of course, if it has been digested by the bird; but if it has not been ground up or damaged in the bird's inside, it will grow when deposited on the land to which the bird has flown.

In the course of their journeys birds get blown far out of their course, and are often glad to rest on islands by the way. Thus the seeds which they have carried may be deposited there. It may happen even more unexpectedly. A bird may be caught by a hawk or other bird of prey when on its annual flight. In its crop may be the undigested food which it ate before setting out. The hawk may swallow this, but as it is not the food that the hawk wants, the seed will be cast up, with the feathers, in little pellets from the hawk's mouth, and so find a resting-place in the soil. In the course of a day a bird may have flown 500 miles with seeds in its crop. The hawk eats the bird and flies far to land before casting up the seed.

EIGHTY-TWO PLANTS THAT GREW FROM EARTH FOUND ON A BIRD'S FOOT

Thus we see what a journey the seed may have traveled in a day. When it does reach the ground it will grow, if the soil and climate be favorable, and in that way a country gets a growth which it may never before have possessed. There is another way in which birds carry seeds. Clods of damp earth sometimes cling to their claws, and in these clods are tiny seeds. Darwin examined the leg of a red-shanked partridge to which was attached a ball of earth weighing 6½ ounces. The ball of earth had been kept hard, just as it was found, on the foot of the bird for three years. Darwin broke it up and found that it contained seeds. He planted and watered them, and from the seeds in the ball of earth which had stuck to that partridge's foot there grew up no fewer than eighty-two plants. Many other birds were examined by the same great man which had earth-clods attached to their feet or the sides of their beaks. One had a piece of earth attached which weighed only nine grains, but from it there grew and flowered a toad-rush.

Of course, not all the uninhabited islands upon which verdure grows have been sown in this way; wind and tides carry seed which live after many days' immersion in the water of the sea, but the birds for thousands and thousands of years have been doing their share, and the fact makes their migrations all the more interesting.

WHY THE BIRDS LEAVE IN AUTUMN AND RETURN IN THE SPRING

The migration of birds is a mystery to most of us. At about the same date every year our wanderers come home to us for the summer, and at about the same date every autumn they leave us. The going and returning may vary a little, if the weather be of an unusual character; but the journeys are sufficiently regular for us to be able to make up a little bird calendar, which reads something like this:

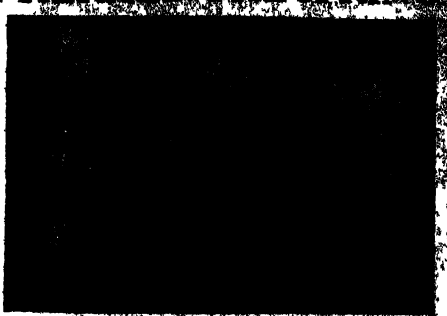
Name of Bird	Leaves Ohio (say)	When it Returns	Days Away
Cuckoo	August 25	April 14	232
Oriole	October 10	April 22	194
Martin	October 12	April 14	184
Swallow	October 15	April 10	177

The movements of the birds which come from colder climes to spend the winter with us may be timed in pretty much the same way, and it is possible to work out a list of the birds' travels just as it is to make a clock from the opening and shutting of flowers.

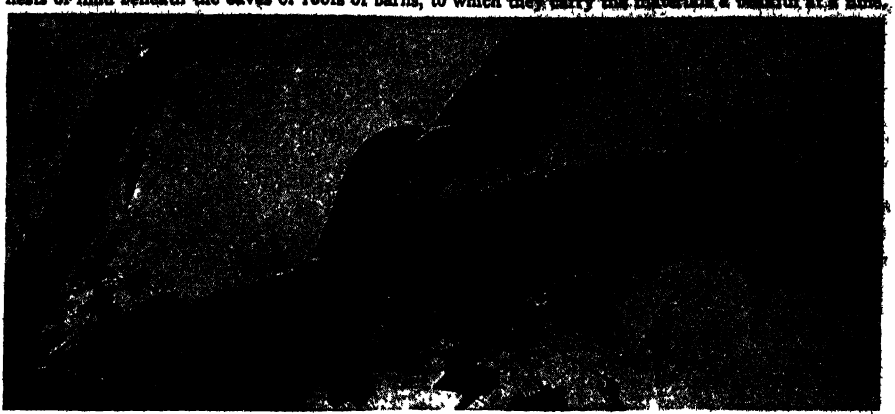
Why the birds migrate we know; how they are able to find their way as they do is another matter. When the summer passes, our fair-weather friends find their food growing rapidly scarce, and the weather getting too cold for

THE SWALLOWS THAT HERALD THE SPRING

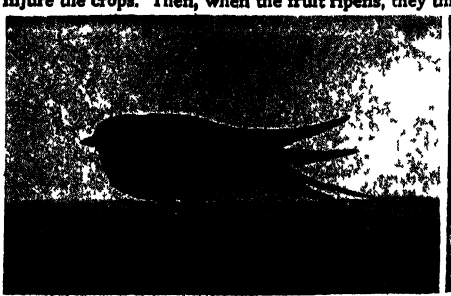


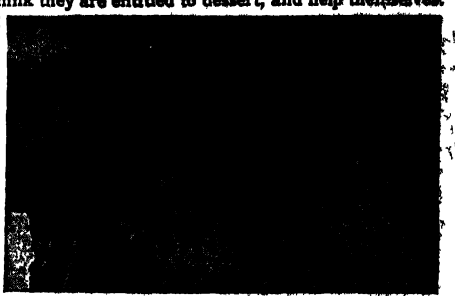


The swallows eat nothing but insects, and cannot do anything but good. They are clever builders, making nests of mud beneath the eaves or roofs of barns, to which they carry the materials a mouthful at a time.

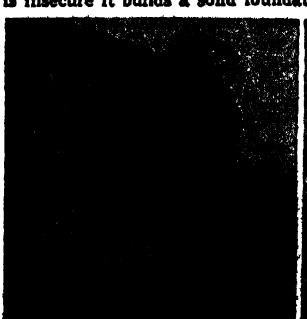


Starlings work with fine appetites in ridding the fields of worms and grubs and all sorts of things which would injure the crops. Then, when the fruit ripens, they think they are entitled to dessert, and help themselves.

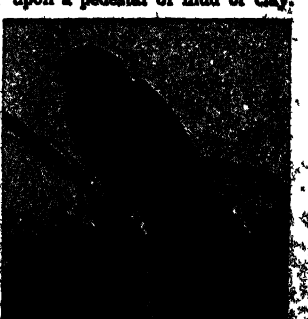




The European house-martin builds close to the windows, making the neatest little home. If the lodging is insecure it builds a solid foundation for its nest, resting the latter upon a pedestal of mud or clay.







The swift is the speediest bird, and is built like a humming-bird. The Chinese eat certain swifts' nests.

The jay is a noisy bird; his beak drop acorns which sow birds, which build in oak-forests. He eats birds' eggs.

Sand-martins are charming birds, cliffs and railway embankments.

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them. Therefore, instinct impels them to fly to lands where they know that the sun is shining and food abundant.

It is wonderful to think that the swifts or swallows which we see about the house on some fine morning midway through October will next day be reveling in the sunshine of Florida.

THE WONDERFUL WAY IN WHICH THE BIRDS COME BACK TO THEIR OLD HOMES

It is sad, of course, to be without them after they have gladdened us with their presence all the summer; but there is comfort in the thought that, all being well, the very same birds will come back to us in the spring. Yes, the same birds. The wood-thrush finds its way back to the bush on which its nest was made the year before, and the swift and swallow come back, year after year, to the very house where their nest was built. One swift is, to our eyes, exactly like another swift, so there may be a mistake, we think. To guard against error birds have been marked, and from the marks made upon them they have been identified as returning to the same house for seven years in succession.

Those people who tell us that the wind decides whither a bird shall fly, and that there is nothing wonderful in these migrations, are right up to a certain point. The birds may fly with the wind, which blows them south in the autumn; they may come back to us when the spring breezes, sweeping over the plains, carry the scent of our fair land into the heart of Mexico. This may be true, but the wind does not parcel out myriads of birds and dot them down all over America just at the particular spot where each bird desires to be. The "homing" instinct is as strong and wonderful in our swifts and swallows as in the homing pigeon.

THE LITTLE GIRL'S SECRET AND THE SECRET OF THE BIRDS

The birds are like the little girl who found the way to her home, a house in a street where all the houses were exactly alike. She could not explain how she found the house; all she knew was that in a certain house in that street there was her little yellow bed upstairs, and she went unerringly to the house which contained it. And it is to their little beds upstairs that the birds return year by year.

It is not hard to distinguish between swallows, swifts, and martins. The swift has long, sickle-like wings and a short tail. The swallow has long, pointed wings, but the distinguishing mark is its forked tail. This is the barn-swallow, whose nests are plastered up inside our barns, looking like little brackets of mud. It is blue-black above, and has a chestnut throat and breast. Then there is another something like it, but much smaller, and with a short, square-ended tail, which makes rows of bottle-shaped nests of mud outside the barn, close up under the eaves, and is called the eaves-swallow. The big purple martin, which nests in the houses on poles set up in the garden, is a near cousin of the swallow's. The swift, though of similar form, is really a relative of the humming-bird, as we might guess from its wonderfully swift flight. It makes its nest of little twigs glued together and to the wall inside a disused chimney; but before there were houses, the swallows nested on rocky ledges, and the martins and swifts in hollow trees. All these birds live on minute flies and other insects which they snap up as they sail and dart through the air.

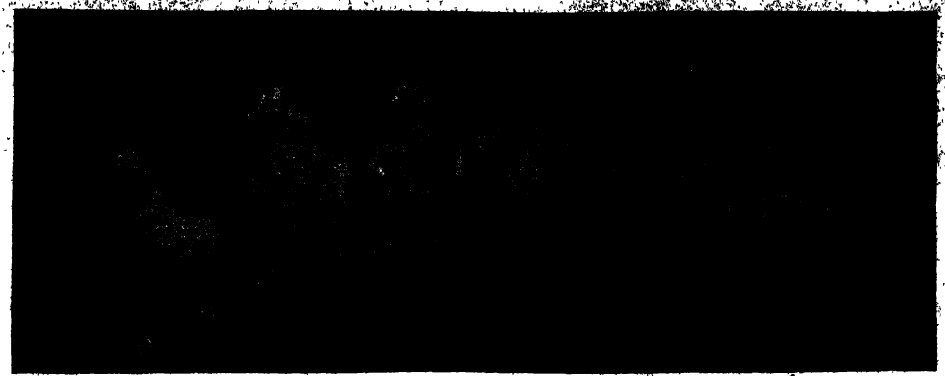
BIRDS THAT BUILD IN TUNNELS AND NESTS THAT ARE GOOD TO EAT

The sand-martin is a smaller bird than these, has a shortish, forked tail, is brown on the back and wings, and white underneath, except the upper part of the breast, where brown again occurs. Its home is made in the sides of sand-pits, the banks of rivers, railway embankments, and so forth. It digs itself a neat little tunnel, eighteen or more inches in length, and there it lays its eggs and hatches its young in security. One martin, which does not come to America, makes a tube of mud beneath a rock or on a wall, and builds its nest at the top of this spout. Swifts' nests are made in holes in rocks, in crevices, in cliffs and walls, and very often in the thatched roofs of houses.

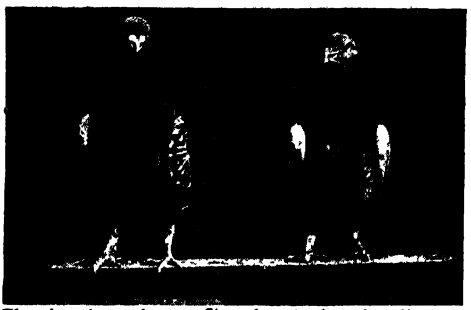
It is a member of the swift family which builds the famous eatable nests. The nest is made from a substance produced from the swift's mouth. It is all glued together and fastened to a rock in some wild cave. There men are let down by ropes to get the nests.

The Chinese consider these nests a

BIRD POSTMEN AND BEAUTY PIGEONS



The ring-dove is one of the tamest birds of its race. It will feed from the hand, and perch about its owner without the least fear. It is called turtle-dove, but the real turtle-dove is a beautiful wood-pigeon.



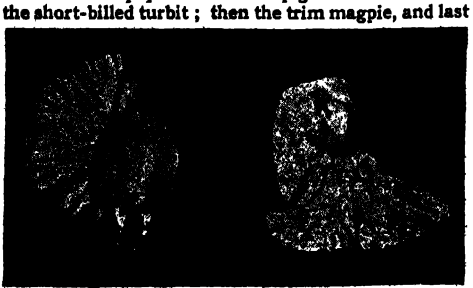
The homing pigeon flies hundreds of miles to its home, and carries messages tied to its legs. In many places they have regular "pigeon-posts."



Pouter pigeons are strange birds which can inflate pouches in their breasts when angry or in love. Other pigeons can do so a little, but not like the pouters.



Here are four popular breeds of pigeons. On the left is an Antwerp—a powerful flier like a homer. Next is the short-billed turbit; then the trim magpie, and last the blue owl-pigeon. The latter three are fancy birds.



The fantails, which are generally white, expand their breasts and spread their tails like a fan, raising them over the back till they touch the back of the head.



There are many varieties of tumbler pigeons. The most costly is the short-faced tumbler. The shorter the beak the more valuable the bird for selling.

The photographs on these pages are by Charles Reid, R. B. Lodge, Lewis Medland, Henry Irving, and Underwood & Underwood, London.

great delicacy. Millions of them are taken every year to China. The price is about two dollars and a half an ounce, and there are about three nests to the ounce. They are washed and stewed and made into soup, but it takes a Chinaman to like it. The nest of the British swallow is cup-shaped, and placed under a roof or down a chimney. It is composed of mud or clay, which the patient birds carry little by little from some convenient spot, then piece it together.

How the Starling Pays for the Damage he does to the Fruit

Just as familiar as the swallows is the starling, a bird which thrives in England, and has become naturalized in America, showing us its glossy, sheeny feathers, with the purple and green metallic reflections and the countless brown spots. It is useless to deny that it is a robber of the orchards; but when the fruit is not ripe, the starling earns his place in the world. He eats slugs, worms, and beetles of all sorts, which, if left alone, would overrun the farmer's lands. One quiet autumn afternoon, when there seemed to be very few starlings about a certain big garden in the country where they are very plentiful, some friends walked out along the road down to some fields. One of these had been newly ploughed. As the friends approached, there was a great commotion. It looked as if the whole surface of the field moved and rose. But in an instant the meaning was clear. Thousands upon thousands of starlings, which had been feasting upon the enemies of the farmer in that field, suddenly rose into the air and passed over the heads of the friends as they walked. For a minute they blotted out the sky. They had done a good afternoon's work for the farmer, even if they had taken toll of his fruit earlier in the autumn.

A Flying Column of Pigeons 200 Miles Long and a Mile Wide

Talking of this swarm of birds reminds us of one of the greatest swarms ever known, the swarms of the passenger pigeons in America. They used to pass over the country in multitudes which no man could number. One observer watched them during a journey of 54 miles. All the way the mighty flock of birds streamed over his head, in clouds which hid the sun, and for that day, and for three days following, the flight continued. Another scientist watched the birds in flight, and calculated that they made up a column a mile in width and about 200 miles in length. They were going to where food would be plentiful, so that they might build nests in the trees and bring up their young in the midst of abundant provisions. One of these nesting-places was measured. It covered a space twenty-eight miles long and from three to four miles wide. Every tree of any size in that great area was crowded with nests of these birds. That was less than fifty years ago. Since then the woodman's axe has felled so many American trees, and the guns of men have killed such swarms of these birds, that the passenger pigeon of America is now becoming as scarce as the American bison.

We have another wild dove in this country; but have more home-reared pigeons than wild ones. They are all descended from the parents of the blue rock-pigeons wild in England to-day.

The Parent of all our Pigeons, the Rock-Pigeon of To-day

The blue rock-pigeon is one of the birds whose plumage very seldom varies. Son is like father, and daughter is like mother. It is bluish grey, of a darker tone than that of what we call the blue homer; and across the closed wings run two broad, distinct bars of black. The neck of the bird is beautifully marked with blue and purple reflections. Indeed, the necks of most pigeons, wild and tame, would do credit, for sheer beauty of plumage, to a peacock. We may call the wild pigeons doves if we like. Doves *are* pigeons.

There are two sorts living in British woods. There is the stock-dove, or smaller wood-pigeon; and there is the ring-dove, the largest of the wild pigeons. This is a shy bird, but its increased numbers show what can be done where birds are kindly treated. It has become very numerous in the London parks; and in parts of London with gardens in which trees still stand, it is no uncommon sight, early in the morning, or late in the evening, to see these beautiful birds swoop down to pick up food which has been put there for other birds. Not long ago two of

these birds used to visit the London garden of people who did all they could to encourage the birds. Next year eight ring-doves were to be seen in and near that garden, showing that the birds had made their nests and reared their little ones in gardens within a few miles of the city.

The wild rock-pigeon eats small shell-fish from the seashore for a part of the year, but at other times it takes grain and seed. A large flock of them can do the farmer's crops some damage.

How the Struggle for Existence is Shared by Gentle Doves

The pretty cream buff-colored doves which we keep at home must not be confused with the birds of which we have here been reading. They do not fly wild in this country. They are regarded as the gentlest of living creatures. But that is all nonsense. Birds are birds, and they all have their little tempers. Doves will peck little birds, just as the little birds which are pecked by the doves will peck birds smaller than themselves.

Just watch a couple of hen doves struggling for the same piece of material for their nests; they peck and beat each other with their wings with as much zeal as if they were a couple of sparrows. We must not think any the worse of them for that; they are charming birds to keep, affectionate and friendly with their masters, but their unending crooning may at times try the patience of the keenest bird-lover.

When we look at a first-class collection of pigeons, it is hard to believe that the neat and trim little rock-dove is the father of them all. See the great and lordly pouter with his huge swelling pouch. He stands high on feathered legs, with his head thrown back, and struts about, and claps his wings when flying as if he were the very lord of all the birds. Look, too, at the comical dignity of the fantail.

The Fantails and the Dragons and Other Handsome Show Pigeons

By careful breeding we have a bird of beautiful white, with a fine fan-like tail, which curves over its back so as to touch the back of its head. The dragons and carriers are just as proud, but in a more severe and stately way. They are not beauties, except in the eyes of the fanciers of these birds. The huge, coarse, fleshy wattles round the eyes and nose make the bird look as if the beak had been thrust through them.

Far more attractive are the quaint birds called Jacobins and nuns, with their curious arrangement of neck feathers, fashioned like hoods and rosettes. We have pigeons with owl-like heads, pigeons with handsome little frills on their breasts, pigeons with feet and legs feathered like farmyard fowls. The least fanciful is the homer, which is the least removed in appearance from the rock-pigeon. Indeed, English boys often buy trapped wild pigeons in the belief that they are getting home-bred birds, only to find that they can never train the strangers to remain. It is the nature of the rock-pigeon to fly away to its old home, and that is the nature of the homer. When they become accustomed to a place, they return to it just as the wild birds return from far lands to their old homes. Pigeons which have been trained to return to their lofts are taken away long distances in baskets by train, and then liberated. With the most wonderful instinct they return unerringly.

How the Pigeons Play the Part of Messengers of the Air

In many places they are trained to carry messages. A note is written on a thin piece of paper and tied to the bird's foot. The pigeon is then thrown up into the air, and away it flies to its home. If it is a well-trained bird it will fly at once to its loft, where a man will be waiting to receive it, to take the message and give the bird a good feed. Newspapers get reports in this way where the telegraph and telephone are impossible. The memory of these birds is remarkable. If we buy a couple of full-grown ones which have been used to flying, we may treat them with the greatest kindness for months, but the first time we let them out, away they fly to their old home. The only thing to do, if we buy old birds, is to let them hatch young ones, and train those. Then, if the old ones do eventually fly away, we shall not be left without pigeons; the young ones will not forsake the home in which they were born. The homer pigeons fly straight forward; they are long-distance birds, but there are others, of the tumbler and tippler family, which

will fly just as long, but always in wide, sweeping circles, round and round their home. For eight or nine hours at a time they keep in the air, affording a good answer to the question as to whether birds fly for enjoyment.

THE CHARMING FAMILY OF THE TITS AND SOME OF ITS FRIENDLY MEMBERS

We must leave the dovecote, with its scores of varieties of pigeons, its runts—giants of the domesticated pigeon family—its turbits and trumpeters, and all the other favorites. We must not forget to mention that in warmer lands they have beautiful crested fruit-eating pigeons, and other pigeons so gay in color that they are called painted pigeons. But these do not appear in the ordinary American dovecote.

We pass now again into the open to take a peep at a charming family of the friendliest of birds, the titmice. These are little fellows, always alive from top to toe, and the very image of liveliness and good cheer. Europe is full of them, and very prettily dressed some of them are, and builders of wonderful nests; and there are others in other parts of the world. None, however, are more interesting and familiar than our own—the jolly little chick-a-dee, the clear-voiced crested "peto" of the Southern States, and half a dozen sorts gladden the hearts of the people in the Rocky Mountains and up and down the Pacific coast.

"I have finished my morning ramble, and am fairly seated in my study," writes Mr. Laugille, "when lo! a familiar voice calls me to the window. 'Chickadee-dee-dee, chick, chick, chickadee, chickadee-dee-dee'—most cheerful and winning voice of a winter's day! There they are, little black-capped titmice, or chickadees, finding a satisfactory repast in the frosted evergreens, where my eyes can detect nothing of the kind; standing upright, tipping forward, stretching upward, leaning to right and left, or hanging by their feet; so brimful of contentment, so sweet-spirited and confiding, with so much of the sunshine of hope in their voices, that they appear like bright and gracefully moving ornaments on the dark evergreens or leafless spray."

Our American titmice do not weave lovely pouches or delicate nests as do some of the foreign ones, but hunt up some deserted woodpecker's hole, or a convenient cranny in an old apple-tree, and after filling it with warm bedding, place in it half a dozen red-speckled eggs, from which presently come forth the oddest of little babies. Occasionally the tomtit will nip off a few fruit-buds in the spring, and some ripe fruit in the autumn, but we ought not to mind that; the buds or fruit which he has taken have contained insects, or he would not have wanted them. The tomtit is a terror to caterpillars. Two of them, which had a nest of young ones, were watched, and it was found that they carried caterpillars to their nest at the rate of thirty an hour all day long. We only want a few families of tomtits in the garden to lessen the work of the gardener and check the ravages of the caterpillars.

The long-tailed European tit has a very long tail. It has a white-crowned head and rich black back; the tail is black, but white-edged. This is the tit which makes the most wonderful bird-nest seen in Europe. It is marvelously formed, of soft, downy feathers, the webs of spiders, and the cocoons of caterpillars; while outside it are placed lichens, which match the trunk of the tree in which it is built, so making it hardly noticeable in its hiding-place.

HOW THE TAILOR-BIRD WORKS WITH NEEDLE AND THREAD

Talking of nests we must not forget that of the tailor-bird. It is not one of our common birds, for its home is in the East, but it would be a shame quite to pass it over. The bird is quite a modest little creature, but it is a master craftsman. It sews together the edges of a big leaf hanging down from a branch. If the leaf be too small, it stitches two together. How it learned to sew is a mystery; but sew it does. It collects strings of fibre or tough silk spun by caterpillars, or pieces of wool, and, using its beak as a needle, it threads these through and through the edges of the leaf, joining them together to form a sort of hanging cup.

Now for a word about the sparrow. There are more sparrows than any other birds in this country. They teem wherever we go, in the fields and parks, in crowded city streets and dismal alleys. Railway stations swarm with sparrows.

the cabstands all have their own flocks. They build all about our houses, in the waterspouts, under the roofs, in outbuildings, in holes and corners, and in all imaginable places. Nothing discourages a sparrow. Painters, decorating the outside of the house where this is written, had to pull down a fat nest from behind a rainpipe. They gave the pipe a coat of paint, then went to work at the other side of the house. Next day, when they returned to the first side to give the pipes there another coat of paint, they found that the sparrows had rebuilt the nest which had been destroyed. The active little birds had been to a haystack near by, collected abundant material, and had re-established their house, not quite perfectly, but well enough to enable them to go on housekeeping.

It is around the sparrow that the great argument as to the value of birds centres. Men have formed a society whose members are pledged to kill rats and sparrows, and numerous clubs exist in the country solely for the slaughter of the poor sparrow.

WHAT HAPPENS TO THE FARMERS WHO KILL THEIR FRIENDS THE SPARROWS

The sparrow does steal much grain from the farmer. He is such a hungry little fellow that he robs without stint, and he even drives away birds more prized which he thinks may share his food. But when we resolve to destroy one of Nature's families, let us look back at what has happened to other people who have done a similar thing. The Government of Maine decided upon and carried out the slaughter of the sparrows some time ago, and in the following year, when there were few sparrows, the caterpillars multiplied so enormously that they not merely ate all the leaves of the fruit-trees, but actually killed the trees themselves. A similar thing happened in France. Therefore, let none of us take any share in trying to prove that men's ideas as to what should live and what should die are wiser than Nature's laws. If men did not kill the birds of prey there would be no plagues of sparrows or thrushes or starlings or any other birds. Men themselves upset the balance of Nature, and make matters worse by exterminating families of birds whose increase is the outcome of their folly and cruelty in regard to other birds. It is as if we dismissed all our police, then wanted to kill the watchdogs which keep out the thieves.

Nobody likes a plague of flies. They bring illness into our homes by carrying germs of disease into our food. Hundreds of birds help to keep down the numbers, yet among the thoughtless they have few friends.

BIRDS WHICH HELP TO GUARD OUR HEALTH AND OUR CROPS

We have, as summer visitors, several species of birds, the flycatchers, which live entirely upon these little winged pests. The phœbe flycatcher is quite a common bird in places where men have much thought or few guns. It goes only to places where flies are most numerous, and is worth its weight in gold. The least flycatcher comes too, but not in such numbers as the other. Both ought to be carefully protected.

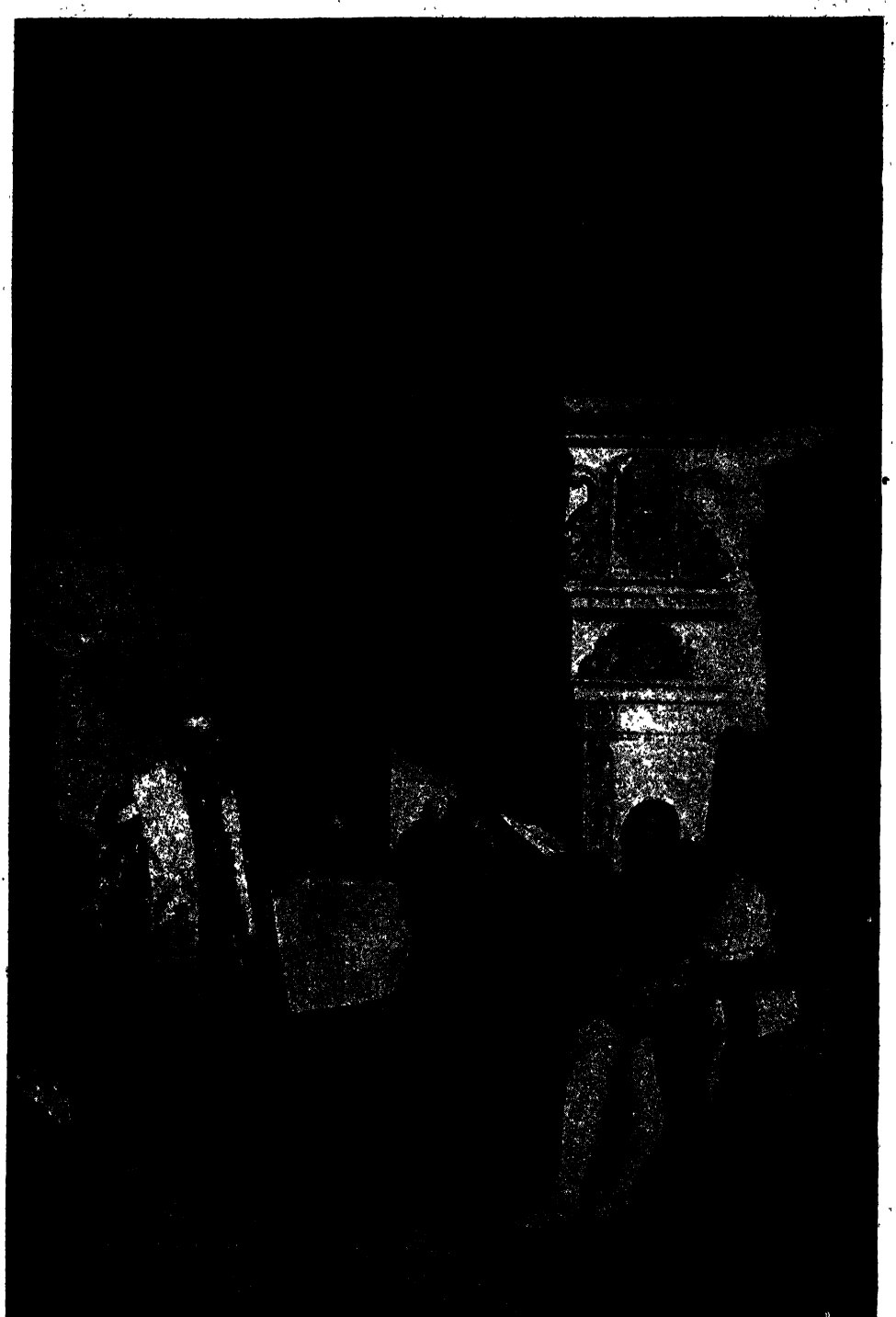
The nuthatch is another bird which the thoughtless would destroy, because it gets nuts and some fruits. But nuts are not ripe until autumn, and the bird has been earning its wages all the spring and summer by picking off the insects and grubs with which the nut-trees are infested. The nut-trees would be better and sounder if the number of nuthatches were largely increased. There is another excellent worker for good in the wagtail, that jolly little bird which so swaggeringly flirts his tail as he runs across English lawns looking for insects, or hops gaily about the side of the pond. He is an insect eater, and no one should harm him.

THE CRUELTY AND STUPIDITY OF MEN WHO SLAY THE BIRDS

We have too few birds in America to wish to sacrifice any of them. Insect pests abound with us; flowers, fruit, and vegetables are ruined every summer's day by them. That shows that there is still work for the birds to do. Remove the birds which help us, and there will come such a plague upon our land as we can only picture from the story of Pharaoh's dreadful lot. Nature's laws are for ever. A man's life and experience are so short that he should not in his brief day attempt to sweep away his excellent little servants because they take something which is of value to him. After all, they honestly earn the grain and fruit that they take.

THE STORIES OF BIRDS END HERE, THE STORIES OF FISHES BEGIN ON PAGE 2339.

PIZARRO AND THE EMPEROR CHARLES V



Francisco Pizarro, a soldier of fortune, came to the New World soon after it was discovered, and learned of the riches of Peru. Here we see him persuading Charles V to send him out to conquer the country.

WHAT THIS STORY TELLS US

"THE Capture of the Inca" is an exciting bit of narrative taken from Prescott's "Conquest of Peru," a book which most girls and all boys will enjoy reading. The book tells the romantic story of the Spaniards' march over the Andes and of the wonderful ancient towns and tribes that lived long ago in those great South American mountains. In the selection given here, the Spaniards, under Pizarro, their commander, have just entered the city of Caxamalca, and are about to entrap the Inca—or Indian king. "The Conquest of Peru," like Prescott's other entertaining histories, was written by the author under the greatest difficulties, as he had but the use of one eye, the other having been blinded in a school-boy frolic by a blow on the eyeball with a hard crust of bread.

CAPTURE OF THE INCA

Continued from 2203

IT was not long before sunset when the van of the royal procession entered the gates of the city. First came some hundreds of the menials, employed to clear the path from every obstacle, and singing songs of triumph as they came, "which, in our ears," says one of the Conquerors, "sounded like the sounds of hell!" Then followed other bodies of different ranks, and dressed in different liveries. Some wore a showy stuff, checkered white and red, like the squares of a chess-board. Others were clad in pure white, bearing hammers or maces of silver or copper; and the guards, together with those in immediate attendance on the prince, were distinguished by a rich azure livery, while the large pendants attached to the ears indicated the Peruvian noble.

Elevated high above his vassals came the Inca Atahuallpa, borne on a sedan or open litter, on which was a sort of throne made of massive gold of inestimable value. The palanquin was lined with the richly-colored plumes of tropical birds, and studded with shining plates of gold and silver. The monarch's attire was much richer than on the preceding evening. Round his neck was suspended a collar of emeralds, of uncommon size and brilliancy. His short hair was decorated with golden ornaments, and the imperial borla encircled his temples. The bearing of the Inca was sedate and dignified; and from his lofty station he looked down on the multitudes below with an air of composure, like one accustomed to command.

As the leading files of the procession entered the great square, larger, says an old chronicler, than any square in Spain, they opened to the right and left for the royal retinue to pass. Everything was conducted in admirable order. The monarch was permitted to traverse the plaza in silence, and not a Spaniard was to be seen. When some five or six thousand of his people had entered the place, Atahuallpa halted, and, turning round with an inquiring look, demanded, "Where are the strangers?"

At this moment Fray Vicente de Valverde, a Dominican friar, Pizarro's chaplain, and afterwards Bishop of Cuzco, came forward with his breviary, or as other accounts state, a Bible, in one hand, and a crucifix in the other, and, approaching the Inca, told him that he came by order of his commander to expound to him the doctrines of the true faith, for which purpose the Spaniards had come from a great distance to his country. The friar then explained, as clearly as he could, the mysterious doctrine of the Trinity, and, ascending high in his account, began with the creation of man, thence passed to his fall, to his

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subsequent redemption by Jesus Christ, to the crucifixion and the ascension, when the Saviour left the Apostle Peter as his Vicegerent upon earth. The friar concluded with beseeching the Peruvian monarch to receive him kindly; to abjure the errors of his own faith, and embrace that of the Christian now proffered to him, the only one by which he could hope for salvation; and, furthermore, to acknowledge himself a tributary of the Emperor Charles the Fifth, who, in that event, would aid and protect him as his loyal vassal.

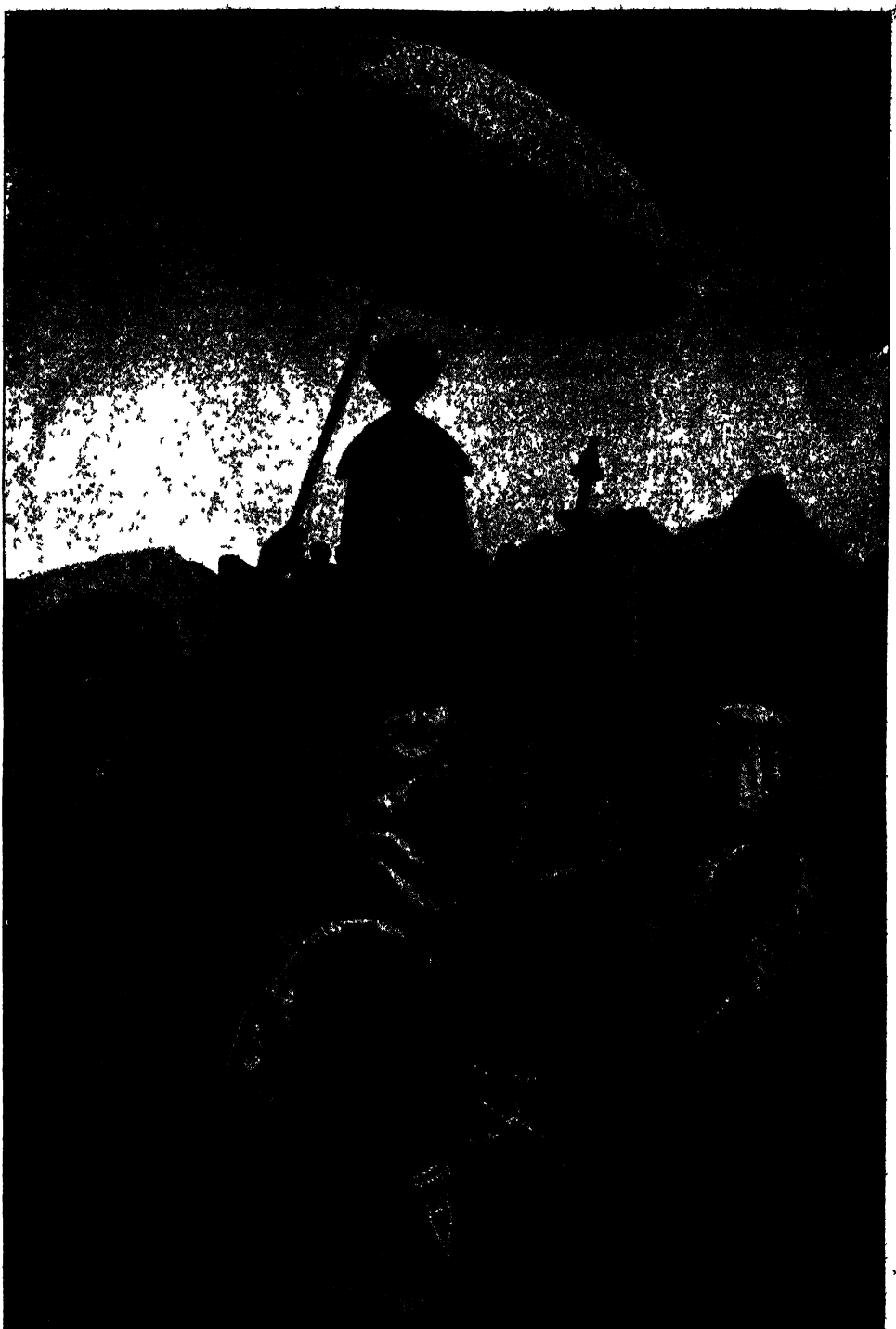
The eyes of the Indian monarch flashed fire, and his dark brow grew darker as he replied, "I will be no man's tributary! I am greater than any prince on earth. Your emperor may be a great prince; I do not doubt it, when I see that he has sent his subjects so far across the waters; and I am willing to hold him as a brother. As for the Pope of whom you speak, he must be crazy to talk of giving away countries which do not belong to him. For my faith," he continued, "I will not change it. Your own God, as you say, was put to death by the very men whom he created. But mine," he concluded, pointing to his deity,—then, alas! sinking in glory behind the mountains,—"my God still lives in the heavens, and looks down on his children."

He then demanded of Valverde by what authority he had said these things. The friar pointed to the book which he held as his authority. Atahuallpa, taking it, turned over the pages a moment, then, as the insult he had received probably flashed across his mind, he threw it down with vehemence, and exclaimed, "Tell your comrades that they shall give me an account of their doings in my land. I will not go from here till they have made me full satisfaction for all the wrongs they have committed."

The friar, greatly scandalized by the indignity offered to the sacred volume, stayed only to pick it up, and hastening to Pizarro, informed him of what had been done, exclaiming at the same time, "Do you not see, that, while we stand here wasting our breath in talking with the dog, full of pride as he is, the fields are filling with Indians! Set on at once! I absolve you." Pizarro saw that the hour had come. He waved a white scarf in the air, the appointed signal. The fatal gun was fired from the fortress. Then springing into the square, the Spanish captain and his followers shouted the old war-cry of "St. Jago and at them!" It was answered by the battle-cry of every Spaniard in the city, as, rushing from the avenues of the great halls in which they were concealed, they poured into the plaza, horse and foot, each in his own dark column, and threw themselves into the midst of the Indian crowd. The latter, taken by surprise, stunned by the report of artillery and muskets, the echo of which reverberated like thunder from the surrounding buildings, and blinded by the smoke which rolled in sulphurous volumes along the square, were seized with a panic. They knew not whither to fly for refuge from the coming ruin. Nobles and commoners, —all were trampled down under the fierce charge of the cavalry, who dealt their blows right and left, without sparing; while their swords, flashing through the thick gloom, carried dismay into the hearts of the wretched natives, who now, for the first time, saw the horse and his rider in all their terrors. They made no resistance,—as, indeed, they had no weapons with which to make it. Every avenue to escape was closed, for the entrance to the square was choked up with the dead bodies of men who perished in vain efforts to fly; and such was the agony of the survivors under the terrible pressure of their assailants, that a large body of Indians, by their convulsive struggles, burst through the wall of stone and dried clay which formed part of the boundary of the plaza! It fell, leaving an opening of more than a hundred paces, through which multitudes now found their way into the country.

Meanwhile the fight, or rather massacre, continued hot around the Inca, whose person was the great object of the assault. His faithful nobles, rallying about him, threw themselves in the way of the assailants, and strove, by tearing them from their saddles, or, at least, by offering their own bosoms as a mark for their vengeance, to shield their beloved master. It is said by some authorities, that they carried weapons concealed under their clothes. If so, it availed them little, as it is not pretended that they used them. But the most timid animal will defend itself when at bay. That they did not so in the present instance is proof that

THE GREAT INCA SITS IN STATE



The ruling class in ancient Peru were called the Incas, and the head the Great Inca. In 1532 the Inca Atahuallpa was slain by the Spaniards, and Peru became one of the richest provinces of Spain.

they had no weapons to use. Yet they still continued to force back the cavaliers, clinging to their horses with dying grasp, and, as one was cut down, another taking the place of his fallen comrade with a loyalty truly affecting.

The Indian monarch, stunned and bewildered, saw his faithful subjects falling around him without comprehending his situation. The litter on which he rode heaved to and fro, as the mighty press swayed backwards and forwards; and he gazed on the overwhelming ruin, like some forlorn mariner, who, tossed about in his bark by the furious elements, sees the lightning's flash and hears the thunder bursting around him, with the consciousness that he can do nothing to avert his fate. At length, weary with the work of destruction, the Spaniards, as the shades of evening grew deeper, felt afraid that the royal prize might, after all, elude them; and some of the cavaliers made a desperate attempt to end the affray at once by taking Atahuallpa's life. But Pizarro, who was nearest his person, called out with stentorian voice, "Let no one who values his life, strike at the Inca;" and, stretching out his arm to shield him, received a wound on the hand from one of his own men,—the only wound received by a Spaniard in the action.

THE INCA IS TAKEN AT LAST

The struggle now became fiercer than ever round the royal litter. It reeled more and more, and at length several of the nobles who supported it having been slain, it was overturned and the Indian prince would have come with violence to the ground, had not his fall been broken, by the efforts of Pizarro and some other of the cavaliers, who caught him in their arms. The imperial borla was instantly snatched from his temples by a soldier named Estete, and the unhappy monarch, strongly secured, was removed to a neighboring building, where he was carefully guarded.

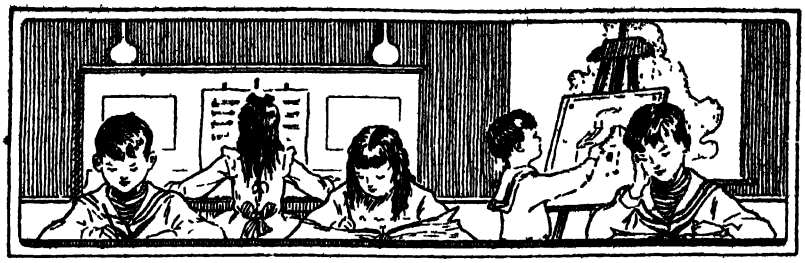
All attempt at resistance now ceased. The fate of the Inca soon spread over town and country. The charm which might have held the Peruvians together was dissolved. Every man thought only of his own safety. Even the soldiery encamped on the adjacent fields took the alarm, and, learning the fatal tidings, were seen flying in every direction before their pursuers, who in the heat of triumph showed no touch of mercy. At length night, more pitiful than man, threw her friendly mantle over the fugitives, and the scattered troops of Pizarro rallied once more at the sound of the trumpet in the bloody square of Caxamalca.

That night Pizarro kept his engagement with the Inca, since he had Atahuallpa to sup with him. The banquet was served in one of the halls facing the great square, which a few hours before had been the scene of slaughter, and the pavement of which was still encumbered with the dead bodies of the Inca's subjects. The captive monarch was placed next his conqueror. He seemed like one who did not yet fully comprehend the extent of his calamity. If he did, he showed an amazing fortitude. "It is the fortune of war," he said. . . .

Atahuallpa, as elsewhere noticed, was, at this time, about thirty years of age. He was well made, and more robust than usual with his countrymen. His head was large, and his countenance might have been called handsome, but that his eyes, which were bloodshot, gave a fierce expression to his features. He was deliberate in speech, grave in manner, and towards his own people stern even to severity; though with the Spaniards he showed himself affable, sometimes even indulging in sallies of mirth.

Pizarro paid every attention to his royal captive, and endeavored to lighten, if he could not dispel, the gloom which, in spite of his assumed equanimity, hung over the monarch's brow. He besought him not to be cast down by his reverses, for his lot had only been that of every prince who had resisted the white men. They had come into the country to proclaim the Gospel, the religion of Jesus Christ, and it was no wonder they had prevailed, when his shield was over them. Heaven had permitted that Atahuallpa's pride should be humbled, because of his hostile intentions towards the Spaniards, and the insults he had offered to the sacred volume. But he bade the Inca take courage and confide in him, for the Spaniards were a generous race, warring only against those who made war on them, and showing grace to all who submitted!—Atahuallpa may have thought the massacre of that day an indifferent commentary on this vaunted lenity.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 2299.



READING

THE DIFFERENCE BETWEEN SUBJECT AND OBJECT

ONCE upon a time a man was riding along on the back of a donkey. And as he rode he heard people say as they passed by, "Look at that great big man riding on that poor little donkey! What a shame!" At last he could stand it no longer, so he got off and picked the donkey up on his back and carried it along.

CONTINUED FROM 1952

But at this all the people laughed so much that he got on again. Every time he rode on the donkey, people said, "How cruel!" and when the donkey rode on him, they said, "How silly!" So at last the poor man went mad.

Now, in the first picture the word DONKEY is said to be the Subject, because it does something; and the word MAN is the Object, because the man has something done to him. But in the second one they are turned round —MAN is Subject, and DONKEY is Object.

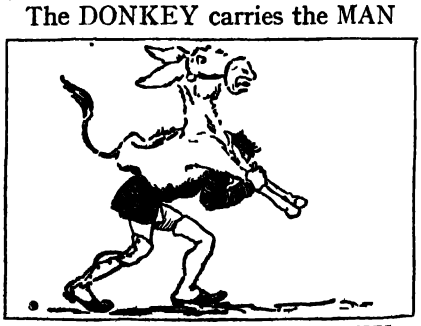
You see, it makes all the difference whether you are the Subject or the Object, and this is important to remember. Let us take a few more pictures that will help us to understand the difference between the SUBJECT and the OBJECT.



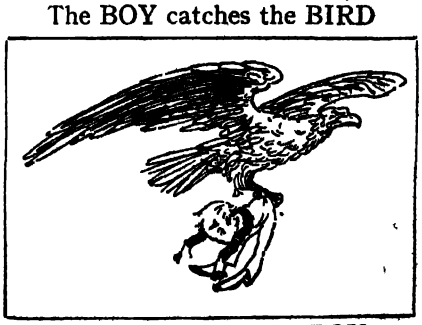
The DONKEY carries the MAN



The BOY catches the BIRD



The MAN carries the DONKEY



The BIRD catches the BOY.



The LION beat the UNICORN



The UNICORN beat the LION



The SPIDER frightened Miss Muffett



Miss Muffett frightened the SPIDER

These are funny pictures, but they show you very clearly the difference between subject and object.

Now, all this time we have been talking about CASE. The subject is said to be in the subject-ive case, and the object in the object-ive case. But you need not trouble about the names as long as you see quite clearly the difference between your chasing a lion and a lion chasing you. And I think everybody can see that!

There is one more CASE, in addition to the two about which we have been reading. This is called the possess-ive case, because it is used when we wish to say that a person possesses something.



"The BABY'S Rattle" means that the rattle belongs to Baby, and that Baby possesses it; so the word "Baby's" is in the possessive case.

Here are some more of the same kind:



DAVID'S Harp



FATHER'S Watch

And here we have all three cases:

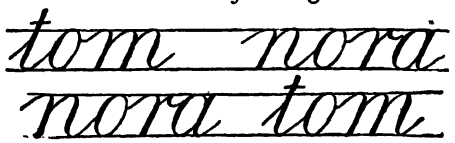


The MICE ran after the FARMER'S WIFE

I wonder if you can pick out the cases here and say which is which.

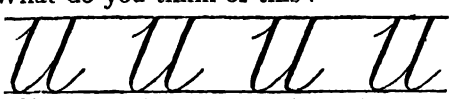
TOM AND NORA WRITE THEIR NAMES

AFTER practising the words their mother had shown them, Tom and Nora found it easy to write their names, and this is what they brought her :



She said they had written and spelt them properly, but that names always begin with a big letter or *capital*, and that they should now learn how to write these.

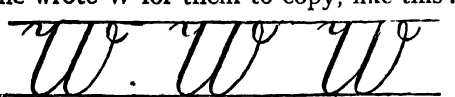
" Some of them," she said, " are very like the small letters you already know. What do you think of this ? "



Nora and Tom both exclaimed : " U—a big u ! "

As their mother finished making some for them to copy, she showed them how she gave the U a little stroke to help it up so high, and to know it from its little brother u. The pencils had to go down and up so far that it was not always easy to keep the strokes even, but that was the only thing Tom and Nora had to be careful about.

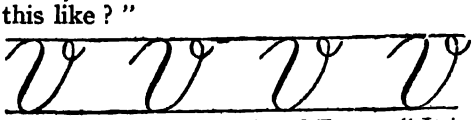
" The next letter is also like a little one grown up. See," said their mother, as she wrote W for them to copy, like this :



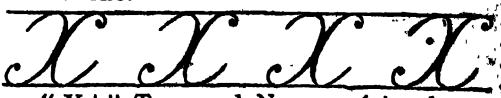
" we make a little turn to start the letter at the top. We could make a little stroke as we did for u, but u and w would then be much alike ; so we make a little turn something like the curly tail of r and v."

" Yes," said Nora. " It looks as though it wanted something to help it to start."

" That reminds me of the next capital letter," her mother said. " What is this like ? "



" That is v ! " exclaimed Tom. " It is just a big v, and it will be easy to write." V was soon written, and then came another capital letter exactly like a small one.



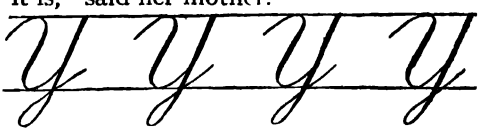
" X ! " Tom and Nora exclaimed together, as though they had discovered a toy put away and forgotten.

" How is it, mother, that the capital letters are so easy ? " asked Nora.

" They are not all like the small letters," her mother said ; " and when I learned to write they were more difficult, because they were made with so many flourishes. But the simpler letters are, the better the writing. Writing is meant to be read, not to puzzle people."

" I see ! " said Nora, as she finished her line of x's.

" Capital Y is also like small y. Here it is," said her mother.

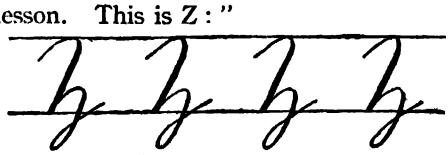


" Yes, that is y," remarked Tom ; " and it is like V with a tail. That is easy."

Nora liked making Y because of its curves, and she called it a pretty letter ; but Tom found the straight strokes easier to make, and by this time he knew just how heavily to press on the pencil without breaking the point. He was all the more careful because he knew what a hindrance it was to have to stop and sharpen the point.

" We have written U, W, V, X, and Y," said Nora. " They are the last letters of the alphabet. Is Z coming next, mother ? If it is we shall know the capital letters of the end of the alphabet first."

" Z is nearly the last of the capital letters that are like small ones, and if we finish with it to-day you will have done well to write six letters in one lesson. This is Z : "



Tom and Nora thought that it, too, was just like the small letter, and they wrote a good line before they put on their hats and went out into the garden.

HOW TO TAKE ONE NUMBER FROM ANOTHER

IN our last lesson we learned how to write down any number in figures. As we know, what we mean by "carrying" a figure in an addition problem; we can add together any two numbers, no matter how many figures there may be in each number.

Add together five thousand seven hundred and four; twenty thousand nine hundred and eighty-seven.

The two numbers are 5,704 and 20,987. Writing them so that "ones" come under "ones," "tens" under "tens," and so on, we get:

5,704	Then say: 7 and 4, 11;
20,987	put down 1, carry 1. 1 and
———	8, 9; put down 9. 9 and
26,691	7, 16; put down 6, carry 1.
	1 and 5, 6; put down
	6. Put down 2.

More than two numbers are added together in the same way; the only difference is that we often have to "carry" more than 1. But as long as the sum is carefully set down, so that the "ones" come correctly under one another, the "tens" under the "tens," and so on, there will be no mistakes.

Add together 297, 30,057, 4,209, 28.

297	Say: 8 and 9, 17; and 7,
30,057	24; and 7, 31. Put down
4,209	1, carry 3.
28	3 and 2, 5; and 5, 10;
———	and 9, 19. Put down 9,
34,591	carry 1.
	1 and 2, 3; and 2, 5.

Put down 5. Put down 4. Put down 3.

EXAMPLES.

1. Add together: Twenty-six thousand and two; four hundred and thirty-seven; five thousand three hundred and forty; seventy-eight; nine hundred and four.

2. Add together: 37,259; 4,023; 584,361; 294.

3. Add together: 77,951; 3,141; 203; 5,925; 64.

By *subtraction*, we find how many things are left when we take away one number from another number of things of the same kind

To subtract 4 from 7 is to find what number is left when 4 is taken from 7. This is *the same thing as finding what number must be added to* 4 *to make* 7.



For the 7 apples are made up of the 4 on the left and the 3 on the right.

First, take away the 4 apples. We have the 3 left. So that 4 *subtracted from* 7 *leaves* 3.

Next, if we have the 4 apples, we must, to make up 7, put the other 3 with them. So that *the number which must be added to* 4 *to make* 7 *is* 3.

To subtract one number from another, we must find what must be *added* to the one number to make the other.

Subtract 3 from 18.

Here we have a number, 3, to which we are to add enough to make 18 together. Now, 18 contains a "ten" and 8 "ones." To make 3 "ones" up to 8 "ones" we must add 5 "ones." Besides this we must add a "ten"; so that in all we have added a "ten" and 5 "ones," or what we call 15.

We set down the working of our sum in this way. Write the numbers under one another just as in addition.

18	Say: 3 and 5 make 8; put down 5.
3	Nothing and 1 ("ten") make 1
—	("ten"); put down 1.
15	

Subtract 9 from 18.

This is a little more difficult, because the number taken away has a greater "ones" figure than the number from which it is taken. But by simple counting we know that we must add another 9 to make 9 into 18.

18	Say: 9 and 9 make 18;
9	put down 9.
—	
9	

Subtract 27 from 45.

45	Say: 7 and 8 make 15; put down
27	8, carry the 1 (which is 1 "ten").
—	By carrying the 1 "ten" we make
18	the 27 up to 37, so that next we
	say 3 and 1 make 4; put down 1.

Subtract 347 from 635.

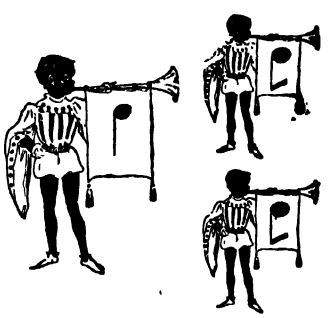
635	Say: 7 and 8 make 15; carry 1
347	(ten). 1 and 4, 5; and 8 make
—	13; carry 1 (hundred). 1 and 3,
288	4; and 2 make 6.

THE STRANGE CAPS THAT THE FAIRIES WEAR

IN our last story of fairyland we found that King Semibreve was the grand person, but two Lords Minim might represent him, and if two Lords Minim failed, four little Masters Crotchet would do quite as well. If you and I walked into the happy rooms where little fairies learn their lessons, we should hear their pretty voices singing :

'Tis Semibreve, the mighty king,
Two Lords Minim for him stand ;
Four Crotchets are the self-same thing
In this, our pretty fairyland.

Then we should see them pull out some very pretty toys, and some very funny caps. The toys are little balls of many different colors, and the caps are of strange and varied make. One cap is like this 𝅝, the very design that the story told us King Semibreve bore on his banner. All the fairies who wear this head-dress have four balls thrown to them, and they have to catch every one. Another cap is like this 𝅗𝅥. Such was the device of the Lords Minim, and all the fairies who wear this strange cap have two balls thrown to them, and they must not fail to catch either one. The third cap is quite like a hatpin ♩, reminding us of the little crotchets, and whosoever wears the same has only to catch one ball. This game is called "The Semibreve, Minim, and Crotchet Frolic."



1. Crotchet equals.....2 Quavers.

Suppose a fairy who wears a little crotchet cap makes up her mind to catch two balls. All the fairies immediately agree that she must be handed a minim cap, because to catch two balls is to be as clever as the fairy who wears a minim cap. Supposing, again, that one of the little fairies with a minim cap catches four balls instead of two, at once she is presented with King Semibreve's symbol 𝅝, because, to catch four balls is to be as clever as the great Semibreve. Again, if the fairy who represents King Semibreve only manages to catch two balls, she will have to take off her cap, and put on the cap of a minim, because, while two balls will do very well for my Lord Minim, they are not enough for his Majesty King Semibreve. And if this same little fairy should prove unfortunate enough to only catch one ball, she would have to be contented with the little hatpin ♩ which in fairy language is called a crotchet. All we have to remember is that *one* ball is not nearly enough for a semibreve, or, indeed, a minim either, but that *one* ball is only enough for little Master Crotchet.

Four balls to a semibreve,
While a minim likes just two ;
One for crotchet, by your leave,
'Tis a game we like—don't you ?

"Yes, yes!" all the fairies cry ; but there is a stir among the little men who wear the crotchet cap, and one little creature steps forward and says :

"What will happen if any of us let a ball fall ?" The voice of the fairy queen gives the reply :

For those of you who are not clever,
A thrilling game is yours for ever ;
A quaver shall your token be,
'Tis drawn just here, ♪
for you to see.

All the little voices join with ours in asking, "What can a quaver be ?" "Well," the fairy queen has whispered, "whenever we see the picture of a little black boy with a tail like this ♪, we may be quite sure that the fairy who wears such a device is not able to bear the weight of one ball, and if she is really anxious to carry one of these balls she will call a little fairy to help her, and the two will join together like this ♫, and so be equal to any merry little crotchet.

So these are the rules of the game :

King Semibreve 𝅝 is worth two minims 𝅗𝅥 𝅗𝅥, and so two minims 𝅗𝅥 𝅗𝅥 represent the great King Semibreve. Four Masters Crotchet ♩ ♩ ♩ ♩ are able to take the place of their king 𝅝, and eight Masters Quaver ♫ ♫ mean the same thing. Two Masters Crotchet may represent my Lord Minim, and four little men bearing the quaver device ♫ will do equally well. Even two little quavers ♪ can take

the place of one Master Crotchet ♪. So, in fairyland, no one feels too small or too unimportant to help. Do you not think our fairies have found out a very nice game? If you like it as much as I do, make the paper caps out of pretty colored paper, and don't forget the balls, because we must catch the right number of balls which each cap requires; and if, perchance, we have to change our caps, we must be quite sure quickly to find the one that should belong to us

DRAWING

HOW TO MAKE PATTERNS AND PAINT THEM

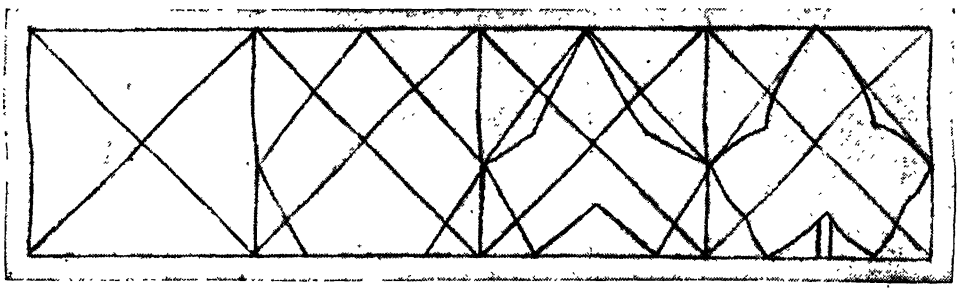
NOW we know how to use our pencils and how to draw straight lines, we can learn how to make patterns and paint them, and we shall be able to use the flowers and leaves we have learnt to draw as well.

When people see a nice, clean, smooth piece of sand by the seashore, they like to make drawings on it with their sticks: children love to put borders of shells and stones from the beach round the castles they dig and build.

Long, long ago, other little children played with the sand, and other fathers and big brothers liked to carve patterns on their weapons and shields.

When we go to museums we see the wonderful patterns the savages make just out of little lines and dots on the spears and knives they use in war, and we can see the gorgeous paintings the Egyptians made to decorate their tombs and the cups and vases painted so beautifully by the Greeks.

We, too, can make patterns for ourselves out of just little lines, or with lines and dots. Let us take our rulers and rule straight lines, one along the top edge and one along the bottom edge of the ruler, marking the inches with little dots along the top line only. Now we will put the ruler away and make little lines from the dots on the top line downwards, till they meet the bottom line, and we shall have spaces in which to put our pattern.



How to make the ivy-leaf pattern out of squares and lines.



Four different ways of arranging leaves to make borders.

There are several ways of arranging the lines to make a pattern shown in the pictures on this page; but we can think of many others for ourselves, and then make some more, using dots as well as lines.

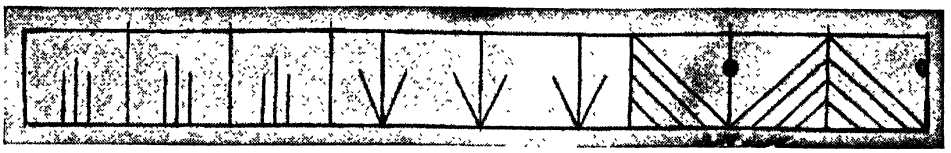
A row of little ivy leaves will make a very pretty pattern, but the ivy leaves

must all be exactly alike, drawn in a much stiffer way than when we are drawing straight from the leaf; and, as making small drawings hurts the eyes, and is not the best way to learn, we will first rule our two lines wider apart to make the divisions two inches wide instead of only one inch. If we rule our lower line two inches below the top line, our spaces will be square—each side two inches long.

We will draw lines from each corner to find the centre of each square, and then draw a shape like the second drawing on the last page in each square first, with the chisel-pointed pencil, held in the way we have already learnt. Afterwards we can look at the ivy leaf again, and draw the shape more carefully, making each one exactly like the other, and leaving out the veins altogether. We can use other leaves if we like—the laurel or lilac or chestnut, or any simple leaf, and then, when we have one nicely drawn, and clean enough, we can color it.

Patterns made with lines and dots look best colored with two colors—red and dark green, or black and yellow. Patterns made with leaves or flowers should be painted in two or three colors—the background behind the design all the same color, and the pattern in the other two. It is a good plan to look at the coloring of some plant first, and then try to match the colors for your drawing—such as the blue and green of the hyacinth flower and its leaves. When three colors are chosen, two of them can be bright colors, and the other should be a soft color, such as grey or brown. Soon we shall learn more about colors, and which of the colors look best together.

After we have tried the borders, we can draw squares, as we learned to do before, and put patterns in these, choosing very easy shapes at first, and making them start from the centre and go outwards to the corners or sides, or from the outer corners and the middle of the sides towards the centre. We must be careful not to crowd the space, and always to think of the *square*, so that our pattern is only suitable for the square shape, and not for any other.



Some patterns made out of squares with dots and lines

There is another way we can try with our patterns made of little lines and dots. We can get one of those unglazed pots which are sold at dairies for holding cream. We can buy a small buff or terra-cotta colored one for a penny. If we get some thick black paint and draw patterns on this with our brush, we can make quite a pretty vase.

The lines must be painted very carefully first all round. The best way to do this, when we begin, is to get a strip of paper, put it against the side of the pot, mark the top and bottom with a dot, and then make the width we want our pattern to be.



Patterns made with lines and dots on an unglazed terra-cotta vase

By moving this paper strip round the vase, we can make marks all round where the lines are to come, and then we can join them afterwards. We can wash off mistakes and try again, and we can try a great many different patterns.

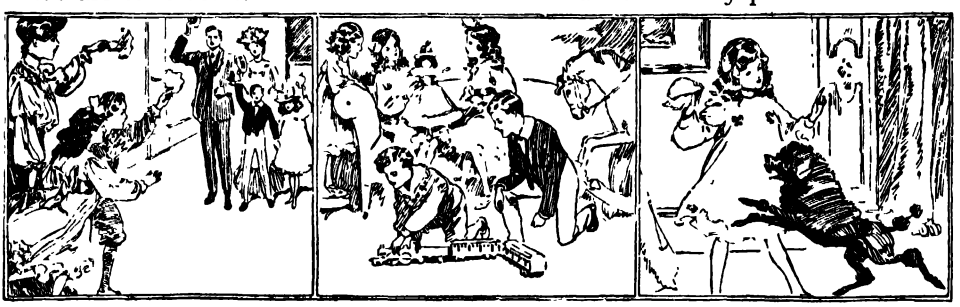
The pattern shown in the picture on this page represents flowers and stalks. It is quite simple to do, and after a little practice the vase should be a great success.

Paint the dots and the circles black, and the lines representing stalks either black or dark green.

LITTLE PICTURE-STORIES IN FRENCH

First line: French. Second line: English words. Third line: As we say it in English.

Nos cousins demeurent à Paris. Nous allons les visiter avec maman.
Our cousins live at Paris. We go them to visit with mamma.
Our cousins live in Paris. We are going with mamma to visit them.
Nous désirons encore les voir. Le commissionaire appelle une voiture.
We desire again them to see. The commissionaire calls a cab.
We want to see them again. The commissionaire calls a cab.
Jeannette dit : " Nos cousins, où demeurent-ils ? " " Près d'ici," répond maman.
Jenny says : " Our cousins, where live they ? " " Near of here," replies mamma.
Jenny says : " Where do our cousins live ? " " Close by," replies mamma.
Nous sommes bientôt arrivés. Nos cousins et notre tante sont très heureux de nous voir.
We are soon arrived. Our cousins and our aunt are very happy of us to see.
We are soon there. Our cousins and our aunt are very pleased to see us.



Nos cousins nous montrent tous leurs joujoux. Ils ont un grand chien.
Our cousins to us show all their toys. They have a great dog.
Our cousins show us all their toys. They have a big dog.
Bébé croit que c'est notre chien nommé Prince. Elle crie : " Mon toutou ! "
Baby believes that this is our dog named Prince. She cries : " My bow-wow ! "
Baby thinks it is our dog Prince. She cries : " My bow-wow ! "
Jeannette dit : " Comment l'appellez-vous ? " Ils disent : " Son nom est Beau."
Jenny says : " How him call you ? " They say : " His name is Beautiful."
Jenny says : " What do you call him ? " They say : " His name is Beau."



Jeannette tend son mouchoir. Bruno saute en l'air et il renverse la table à thé.
Jenny tenders her handkerchief. Bruno jumps in the air and he upsets the table to tea.
Jenny holds out her handkerchief. Bruno jumps up and upsets the tea-table.
Le lait est répandu sur la robe de maman. Maman dit : " Cela n'est rien."
The milk is spilt upon the robe of mamma. Mamma says : " That not is nothing."
The milk is spilt on mamma's dress. Mamma says : " It is no matter."
Notre tante crie : " Quel dommage ! Je suis fâchée ! " Nous sonnons la clôche.
Our aunt cries : " What damage ! I am sorry ! " We sound the bell.
Our aunt cries : " What a pity ! I am so sorry ! " We ring the bell.
La bonne entre pour enlever les tasses cassées. Nous sommes réjouis de notre visite.
The maid enters for to take away the cups broken. We are rejoiced of our visit.
The maid comes in to take away the broken cups. We have enjoyed our visit.

THE NEXT SCHOOL LESSONS BEGIN ON PAGE 2369.



A WOMAN AGAINST A KING

CONTINUED FROM 2020

THE Earl of Nithsdale was condemned to death for trying to put James, the Old Pretender, on the throne in 1715. His wife heard of his imprisonment in the Tower, and went up to London from Scotland, traveling through deep snows. But the Governor of the Tower would only allow her to enter on condition that she remained a prisoner. However, she could not then have helped her husband; so she bribed the guards, got admission daily, and quite won their confidence.

After fruitless attempts to obtain a pardon from King George I., Lady Nithsdale made up her mind twenty-four hours before the time of execution that she would help her husband to escape. At first he would not listen to her plan, lest it should endanger her, but at last he yielded.

The evening before the date fixed for the execution of the earl and other prisoners, Lady Nithsdale took two women with her into the Tower, and in turn brought them to her husband's room to say farewell to him. The first, a Mrs. Mills, wore concealed garments, which the second, Mrs. Morgan, put on when quitting the Tower; for Mrs. Morgan took off the outer garments she wore and Lady Nithsdale put them on her husband. Every little detail was thought out beforehand, and the cleverness, skill, and presence of mind shown by this resolute woman were very remarkable. Mrs. Mills was directed to come in, crying and afflicted with grief, so that when Lord Nithsdale, who personated her, went out, he did so wearing a hood and with his face buried in a handkerchief to cover up his beard. Lady Nithsdale walked close behind him for a little distance to conceal his manly gait, and then returned to his empty room. The pretended Mrs. Mills had been hurried off to fetch Lady Nithsdale's maid.

In the deserted room, Lady Nithsdale carried on a pretended conversation with her husband, asking questions and imitating his voice in answer, as well as striding up and down to make the people in the outer room think her husband was still there. Thus she allowed time for him to get clear of the Tower; then she opened the door, and, standing half in the room with hands on the door, took a pretended farewell for the night, pulled the string through the latch of the door so that it could only open on the inside, and, telling the servant he need not trouble to take in candles, passed down the stairs and drove off in a coach.

The whole story, related by Lady Nithsdale some time after, shows wonderful self-control, skilful acting, and self-sacrifice, for she was hazarding her own life. King George was furious when he found what she had done, and ordered her arrest; but she escaped by her clever wits, fetched her boy from Scotland, and joined her husband in France. Her descendants still treasure the shawl used as part of the disguise worn by the earl.

THE GIRL WHO WALKED TO LONDON

THE girl about whom this story tells was born nearly two hundred years ago. She was the daughter of quite poor people, who were living in Scotland. Now, there was a law made at that time which was very unjust, and the punishment for breaking this law was death. Our heroine, whose name was Helen Walker, had a younger sister whom she loved very fondly, and this sister was charged with breaking the cruel law; and, though she was innocent, it was almost certain she would be condemned.

But it so happened that if Helen had been willing to tell the judges a falsehood, which no one could ever have found out, her story would have been taken as a proof that her sister had not done what she was accused of. She could have saved her sister by telling a lie, and no one would have known.

But Helen had been taught that there is nothing in the world which can make it right to tell a lie. She would have given her own life gladly to save her sister; but she could not have uttered a falsehood to save herself, and she would not utter a falsehood to save her sister. The sister was not like that, and, when Helen went to see her in prison, she pleaded passionately, begging her to tell the lie, and reproaching her for her cruelty in refusing to do so easy a thing merely because it was wrong. Some people, too, would have told her that it would not really be wrong with so good a reason for it. But Helen would not do it, in spite of all temptation.

But, if she would not lie, there was still one way in which she might perhaps save her sister. The judges would condemn her to death; but if Helen could win the King's pardon she would be set free. But what chance was there of getting the King's pardon? The King lived in London, hundreds of miles away. How could a poor girl in Edinburgh get to the King in London? To go from Edinburgh to London nowadays does not seem very alarming, but two hundred years ago it was a very different thing. There were no trains. Great people could go in their carriages, or gentlemen might go on horseback; people who could afford it might take the coach. But there was nothing for a poor girl like Helen but to tramp the whole long journey on foot, day after day, with just the chance of a friendly lift from a cart now and then; so the journey would be weary and long. Worse than that, it would be dangerous, for in those days highwaymen and footpads and tramps often attacked people who were going along the country roads alone. But it was the only chance of saving her sister, and, starting on her long walk, she did reach London in safety.

Now, in London there was a great Scottish lord living, the Duke of Argyll, to whom Helen's father had once done some service. So, when she got there, Helen sent a letter to the duke to entreat him to help her to get speech with the Queen, for the King himself was away from England. The duke admired her courage and her truthfulness so much that he did help her. And when she came before the Queen, she pleaded so movingly, showing that her sister was really innocent, that she persuaded the Queen; and the pardon was granted.

This is a true story, and out of it Sir Walter Scott made up the story of "The Heart of Midlothian," which is told on page 1773; and so, because his heroine, Jeannie Deans, will never be forgotten, the fame of the real Jeannie—Helen Walker—and of her golden deed will live for ever.

THE NEXT GOLDEN DEEDS ARE ON PAGE 2347.



THE SUBJECTS OF POETRY

HAVING gained a general idea of the uses of poetry and of how we can best proceed with the very pleasant task of storing our minds with good poetry, we have to turn next to a new series of studies, in noticing the different purposes of poetry, the subjects with which it deals. There are a great many of these, but as we shall only take up one at a time they will be easy to learn, and when we have gone through this series we shall find ourselves prepared to understand more clearly the poetry of each great poet, as, later on, we shall come to learn that also.

THE POETRY OF NATURE

CONTINUED FROM 2195

EVERY country has a different kind of poetry. That is quite natural. Just as the peoples differ, so will their thoughts and feelings differ. We cannot attempt here to show those differences between the poetry of one country and another; it is enough to say that the poetry of France, of Italy, or of Scandinavia is quite another thing from that of America. English poetry, too, is somewhat different from Irish or Scottish, though many Scottish and Irish poets have written poems which are purely English in spirit and form.

The first thing we notice in reading English poetry is what is called the "feeling for Nature." This simply means that the writers all seem to be in love with the natural objects and the rural life of their own land. They rejoice to sing of spring mornings, of summer days and sunsets, of lakes and rivers, mountains and glens, of larks and nightingales, the sea that breaks along her many coasts, and so on.

This love of Nature does not appear so much in the poetry of any other country as in that of England.

Even the great dramatic poets, like Shakespeare and Christopher Marlowe, had this love for the natural delights of the country. But long before Shakespeare and Marlowe, long before Chaucer even—and he loved the natural scenes of Nature, and sang of them sweetly—this "note," as it is called, had been given to all her poetry.

The very oldest English song was about the coming of summer. It was written a thousand years ago, and its words are so simple, that, although our language has greatly changed since then, it is not very difficult to read it even now. We shall print it in modern English, however, as it was changed by a poet who lived two hundred years ago:

Summer is a-coming in,
Loud sing, cuckoo;
Groweth seed, and bloweth mead,
And springeth the wood now,
Sing, cuckoo, cuckoo.

Ewe bleateth after lamb,
Loweth calf after cow,
Bullock starteth, buck departeth,
Merry sing, cuckoo,
Cuckoo, cuckoo,
Well singeth the cuckoo,
Nor cease to sing now;
Sing cuckoo, now,
Sing cuckoo.

And in all these years all the poets have been singing out of the fulness of their hearts of the changing seasons and the green and golden beauties of the land, so that a vast amount of the "poetry of Nature" is to be found in the works of our poets.

Tennyson gives us many pictures of Nature that are perfectly beautiful, as, for instance, "The Brook" (see page 103); while Wordsworth in such a poem as "The Daffodils" (see page 104), and Bryant, Whitman, Burns, Longfellow, and many more, are so filled with this great love of Nature that we might almost think in reading them we were listening to the very voice of Nature herself.

That is really what great poetry ought to be—the voice of Nature. And American poetry is great largely because so much of it has sprung from our love of her beauties.

JUNE

This selection is taken from "The Vision of Sir Launfal," by James Russell Lowell, one of our foremost American poets. These verses contain the most beautiful description of June that has ever been written in any language.

AND what is so rare as a day in June ?
Then, if ever, come perfect days ;
Then Heaven tries earth if it be in tune,
And over it softly her warm ear lays ;
Whether we look or whether we listen,
We hear life murmur or see it glisten ;

.

The little bird sits at his door in the sun,
Atilt like a blossom among the leaves,
And lets his illumined being o'errun
With the deluge of summer it receives ;
His mate feels the eggs beneath her wings,
And the heart in her dumb breast flutters and sings ;
He sings to the wide world and she to her nest,—
In the nice ear of Nature which song is best ?

THE BRIDGE

This poem by Longfellow, which has for many years been a favorite recitation, is certainly one of the finest of his shorter pieces. The subject is picturesque and suggestive of thought. The poem is understood to have been inspired by just such a scene in Longfellow's native town of Portland, Maine.

I STOOD on the bridge at midnight,
As the clocks were striking the hour,
And the moon rose o'er the city,
Behind the dark church-tower.

I saw her bright reflection
In the waters under me,
Like a golden goblet falling
And sinking into the sea.

And far in the hazy distance
Of that lovely night in June,
The blaze of the flaming furnace
Gleamed redder than the moon.

Among the long, black rafters
The waving shadows lay,
And the current that came from the ocean
Seemed to lift and bear them away ;

As, sweeping and eddying through them,
Rose the belated tide,
And, streaming into the moonlight,
The seaweed floated wide.

And, like those waters rushing
Among the wooden piers,
A flood of thoughts came o'er me
That filled my eyes with tears.

How often, oh, how often,
In the days that had gone by,
I had stood on that bridge at midnight,
And gazed on that wave and sky

How often, oh, how often,
I had wished that the ebbing tide
Would bear me away on its bosom
O'er the ocean wild and wide !

For my heart was hot, and restless,
And my life was full of care,
And the burden laid upon me
Seemed greater than I could bear.

But now it has fallen from me,
It is buried in the sea ;
And only the sorrow of others
Throws its shadow over me.

Yet whenever I cross the river,
On its bridge with wooden piers,
Like the odour of brine from the ocean
Comes the thought of other years.

And I think how many thousands
Of care-encumbered men,
Each bearing his burden of sorrow,
Have crossed the bridge since then.

.

And for ever and for ever,
As long as the river flows,
As long as the heart has passions,
As long as life has woes ;

The moon and its broken reflection
And its shadows shall appear,
As a symbol of love in heaven,
And its wavering image here.

AUTUMN

These lines are by the English poet, Percy Bysshe Shelley, and illustrate a view of Nature which, though it lacks the simplicity which we find in the Nature poems of Robert Burns, gives us beauty of another kind, complex and more or less artificial, yet wonderfully rhythmical and melodious.

THE warm sun is failing, the bleak wind is wailing,
The bare boughs are sighing, the pale flowers are dying ;
And the Year
On the earth, her deathbed, in a shroud of leaves dead
Is lying
Come, Months, come away,
From November to May,
In your saddest array—
Follow the bier
Of the dead cold Year,
And like dim shadows watch by her sepulchre.

The chill rain is falling, the nipt worm is crawling,
The rivers are swelling, the thunder is knelling
For the Year ;
The blithe swallows are flown, and the lizards each gone
To his dwelling.
Come, Months, come away,
Put on white, black, and gray ;
Let your light sisters play ;
Ye, follow the bier
Of the dead cold Year,
And make her grave green with tear on tear.

O, BOYS, CARRY ME 'LONG

These old darkey melodies are very dear to the hearts of most of us. The following was written by Stephen Collins Foster, who is also the author of "The Old Kentucky Home."

OH! carry me 'long;
Der's no more trouble for me;
I's guine to roam in a happy home.
Where all de niggas am free.
I've worked long in de fields;
I've handled many a hoe;
I'll turn my eye, before I die,
And see de sugar-cane grow.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

All ober de land,
I've wandered many a day;
To blow de horn, and mind de corn,
And keep de possum away.
No use for me now,
So, darkies, bury me low;
My horn is dry and I must lie,
Wha de possum nebber can go.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de boys,
Wid hearts so happy and light,
Dey sing a song, de whole day long,
And dance de juba at night.
Farewell to de fields
Ob cotton, 'bacco, and all;
I's guine to hoe, in a bressed row
Wha de corn grows mellow and tall.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de hills,
De meadows covered wid green,
Old brindle Boss, and de old gray hoss,
All beaten, broken and lean.
Farewell to de dog,
Dat always followed me round;
Old Sancho 'll wail, and droop his tail,
When I am under de ground.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

THE SILENT VOICES

WHEN the dumb Hour, clothed in black,
Brings the Dreams about my bed,
Call me not so often back,
Silent Voices of the dead,
Toward the lowland ways behind me,
And the sunlight that is gone!
Call me rather, silent Voices,
Forward to the starry track
Glimmering up the heights beyond me
On, and always on!

—LORD TENNYSON.

THE OLD ARM-CHAIR

Most of us have some inanimate thing in our possession around which cluster memories that make it unspeakably dear to us. Such a possession is typified in "The Old Arm-Chair," written by Eliza Cook, an English poet.

I LOVE it, I love it; and who shall dare
To chide me for loving that old arm-chair?
I've treasured it long as a sainted prize;
I've bedew'd it with tears, and embalm'd it with sighs.
'Tis bound by a thousand bands to my heart;
Not a tie will break, not a link will start.
Would ye learn the spell?—a mother sat there;
And a sacred thing is that old arm-chair.

In childhood's hour I linger'd near
The hallow'd seat with listening ear;
And gentle words that a mother would give
To fit me to die, and teach me to live.
She told me shame would never betide,
With truth for my creed and God for my guide;
She taught me to lisp my earliest prayer,
As I knelt beside the old arm-chair.

I sat and watch'd her many a day,
When her eye grew dim, and her locks were gray;
And I almost worshipp'd her when she smiled,
And turn'd from her Bible, to bless her child.
Years roll'd on: but the last one sped—
My idol was shattered; my earth-star fled;
I learnt how much the heart can bear,
When I saw her die in that old arm-chair.

'Tis past, 'tis past, but I gaze on it now
With quivering breath and throbbing brow;
'Twas there she nursed me; 'twas there she died;
And Memory flows with lava tide.
Say it is folly, and deem me weak,
While the scalding drops start down my cheek;
But I love it, I love it; and cannot tear
My soul from a mother's old arm-chair.

* MY MENAGERIE

This little poem by Mrs. Elder is full of the quaint fancies of childhood. Who among us has not lain on the soft, warm grass and watched the pictures in the sky form and melt away as the ever-changing clouds drift across the heavens?

NO need to the circus to go have I,
For a whole menagerie lives in the sky!

And when in the tall, thick grass I lie,
I see the procession go passing by.

There are lions and bears and queer little cats,
And moolies and mice and long-tailed rats,

And great big elephants trotting behind
Some very fat pigs who, I guess, have just dined.

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And sometimes a clown slyly shows his face,
As he struts along at a pompous pace.

And I laugh as I watch the caravan pass,
As I lie on my back on the soft, green grass.

It's lots nicer than sitting squeezed in a row,
And the best of it is there's no pay, you know.

All you have to do is to look at the sky,
And you'll see the procession go passing by.

THE BAREFOOT BOY

'The barefoot boy," who does not love to see him at play in his care-free days before the time comes when his feet "lose the freedom of the sod"? John Greenleaf Whittier shows him to us in all his winsomeness in this little poem.

BLESSINGS on thee, little man,
Barefoot boy, with cheek of tan!
With thy turned-up pantaloons,
And thy merry whistled tunes;
With thy red lip, redder still
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy, —
I was once a barefoot boy!
Prince thou art, — the grown-up man
Only is republican.
Let the million-dollared ride!
Barefoot trudging at his side,
Thou hast more than he can buy
In the reach of ear and eye, —
Outward sunshine, inward joy:
Blessings on thee, barefoot boy!

Oh, for boyhood's painless play,
Sleep that wakes in laughing day,
Health that mocks the doctor's rules,
Knowledge never learned of schools,
Of the wild bee's morning chase,
Of the wild-flower's time and place,
Flight of fowl and habitude
Of the tenants of the wood;
How the tortoise bears his shell,
How the woodchuck digs his cell,
And the ground-mole sinks his well;
How the robin feeds her young,
How the oriole's nest is hung;
Where the whitest lilies blow,
Where the freshest berries grow,
Where the ground-nut trails its vine,
Where the wood-grape's clusters shine:
Of the black wasp's cunning way,
Mason of his walls of clay,
And the architectural plans
Of gray hornet artisans!
For, eschewing books and tasks,
Nature answers all he asks;
Hand in hand with her he walks;
Face to face with her he talks,
Part and parcel of her joy, —
Blessings on the barefoot boy!

Oh for boyhood's time of June,
Crowding years in one brief moon,
When all things I heard or saw,
Me, their master, waited for.
I was rich in flowers and trees,
Humming-birds and honey-bees;
For my sport the squirrel played,
Plied the snouted mole his spade;
For my taste the blackberry cone
Purpled over hedge and stone;
Laughed the brook for my delight
Through the day and through the night,
Whispering at the garden wall,
Talked with me from fall to fall;
Mine the sand-rimmed pickerel pond,
Mine the walnut slopes beyond,
Mine, on bending orchard trees,
Apples of Hesperides!
Still as my horizon grew,
Larger grew my riches too;
All the world I saw or knew
Seemed a complex Chinese toy,
Fashioned for a barefoot boy!

Oh for festal dainties spread,
Like my bowl of milk and bread;
Pewter spoon and bowl of wood,
On the door-stone, gray and rude!
O'er me, like a regal tent,
Cloudy-ribbed, the sunset bent,
Purple-curtained, fringed with gold,
Looped in many a wind-swung fold;
While for music came the play
Of the pied frogs' orchestra;
And, to light the noisy choir,
Lit the fly his lamp of fire.
I was monarch: pomp and joy
Waited on the barefoot boy!

Cheerily, then, my little man,
Live and laugh, as boyhood can!
Though the flinty slopes be hard,
Stubble-speared the new-mown sward,
Every morn shall lead thee through
Fresh baptisms of the dew;
Every evening from thy feet
Shall the cool wind kiss the heat:
All too soon these feet must hide
In the prison cells of pride,
Lose the freedom of the sod,
Like the colt's for work be shod,
Made to tread the mills of toil,
Up and down in ceaseless moil:
Happy if their track be found
Never on forbidden ground;
Happy if they sink not in
Quick and treacherous sands of sin.
Ah! that thou couldst know thy joy,
Ere it passes, barefoot boy!

A VISIT FROM ST. NICHOLAS

The annual visit of St. Nicholas (better known as Santa Claus) is the occasion of much anticipatory excitement among our boys and girls. Clement C. Moore's poem is a great favorite with our children. It gives a vivid description of the visit.

'TWAS the night before Christmas, when all through the house
Not a creature was stirring, not even a mouse;
The stockings were hung by the chimney with care,
In hopes that St. Nicholas soon would be there;

The children were nestled all snug in their beds,
While visions of sugar-plums danced in their heads;
And Mamma in her kerchief, and I in my cap,
Had just settled our brains for a long winter nap;
When out on the lawn there arose such a clatter,
I sprang from my bed to see what was the matter.
Away to the window I flew like a flash,
Tore open the shutters and threw up the sash.
The moon, on the breast of the new-fallen snow,
Gave a lustre of midday to objects below;
When, what to my wondering eyes should appear,
But a miniature sleigh and eight tiny reindeer,
With a little old driver, so lively and quick,
I knew in a moment it must be St. Nick.
More rapid than eagles his coursers they came,
And he whistled, and shouted, and called them by name:
"Now, Dasher! now, Dancer! now, Prancer and Vixen
On! Comet, on! Cupid, on! Dunder and Blixen—
To the top of the porch, to the top of the wall!
Now, dash away, dash away, dash away all!"
As dry leaves that before the wild hurricane fly,
When they meet with an obstacle, mount to the sky,
So, up to the house-top the coursers they flew,
With the sleigh full of toys—and St. Nicholas too.
And then in a twinkling I heard on the roof
The prancing and pawing of each little hoof.
As, I drew in my head, and was turning around,
Down the chimney St. Nicholas came with a bound.
He was dressed all in fur from his head to his foot,
And his clothes were all tarnished with ashes and soot;
A bundle of toys he had flung on his back,
And he looked like a peddler just opening his pack.
His eyes how they twinkled! his dimples how merry!
His cheeks were like roses, his nose like a cherry;
His droll little mouth was drawn up like a bow,
And the beard on his chin was as white as the snow.
The stump of a pipe he held tight in his teeth,
And the smoke, it encircled his head like a wreath.
He had a broad face and a little round belly
That shook, when he laughed, like a bowl full of jelly.
He was chubby and plump—a right jolly old elf;
And I laughed when I saw him, in spite of myself.
A wink of his eye, and a twist of his head,
Soon gave me to know I had nothing to dread.
He spoke not a word, but went straight to his work,
And filled all the stockings; then turned with a jerk,
And laying his finger aside of his nose,
And giving a nod, up the chimney he rose.
He sprang to his sleigh, to his team gave a whistle;
And away they all flew like the down of a thistle;
But I heard him exclaim, ere he drove out of sight,
"Happy Christmas to all, and to all a good-night!"

THE LOVE KNOT

The following poem, of which the author is Nora Perry, is full of a rollicking rhythm that has a certain charm. The simple manners of the maiden, and the artless way in which she won the heart of her lover, are graphically described.

TYING her bonnet under her chin,
She tied her raven ringlets in;
But not alone in its silken snare
Did she catch her lovely floating hair,
For, tying her bonnet under her chin,
She tied a young man's heart within.

They were strolling together up the hill,
Where the wind comes blowing merry and chill;
And it blew the curls a frolicsome race,
All over the happy peach-colour'd face,
Till, scolding and laughing, she tied them in,
Under her beautiful dimpled chin.

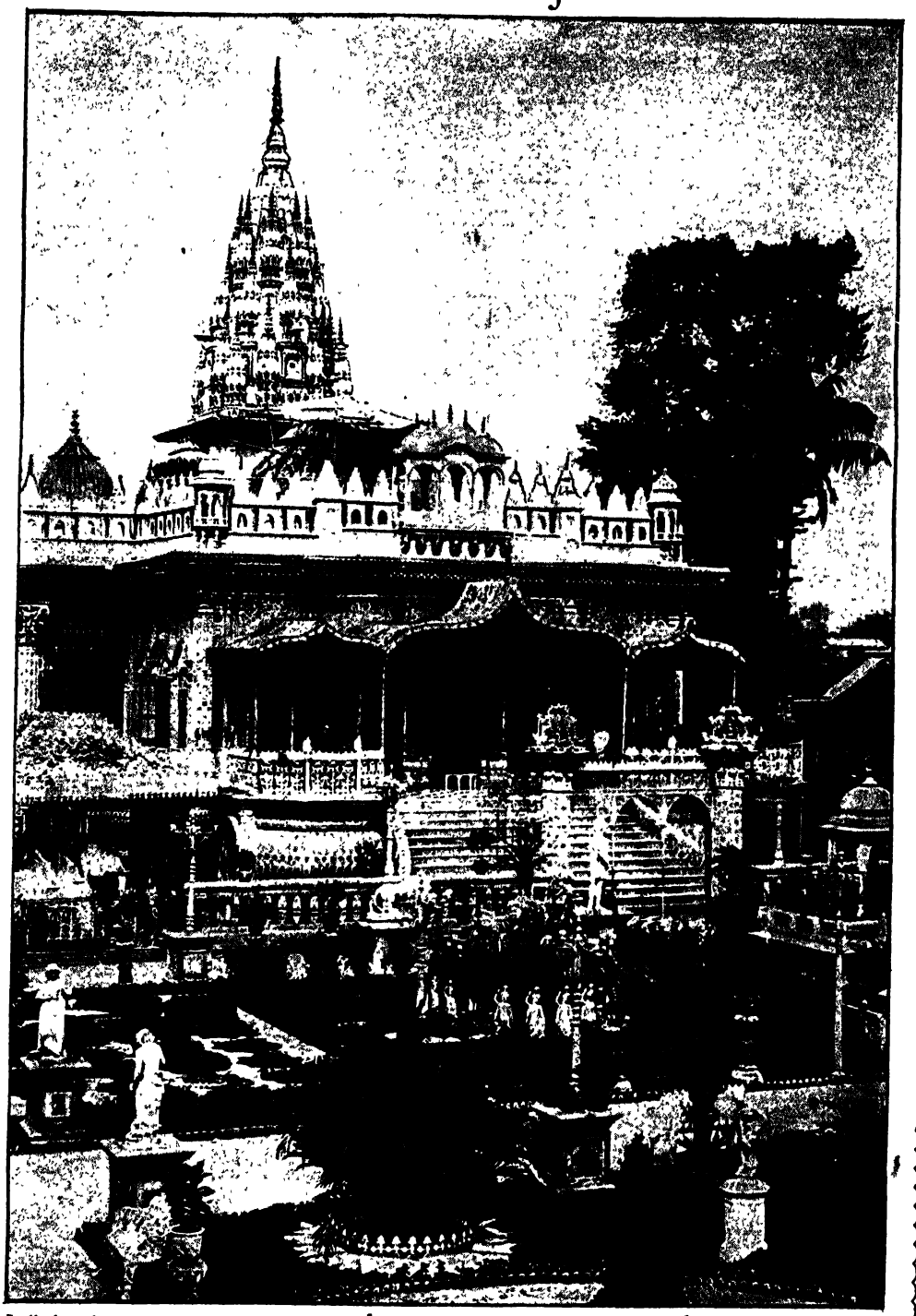
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And it blew a colour, bright as the bloom
Of the pinkest fuchsia's tossing plume,
All over the cheeks of the prettiest girl
That ever imprison'd a romping curl,
Or, tying her bonnet under her chin,
Tied a young man's heart within.

Steeper and steeper grew the hill;
Madder, merrier, chillier still
The western wind blew down, and play'd
The wildest tricks with the little maid,
As, tying her bonnet under her chin,
She tied a young man's heart within.

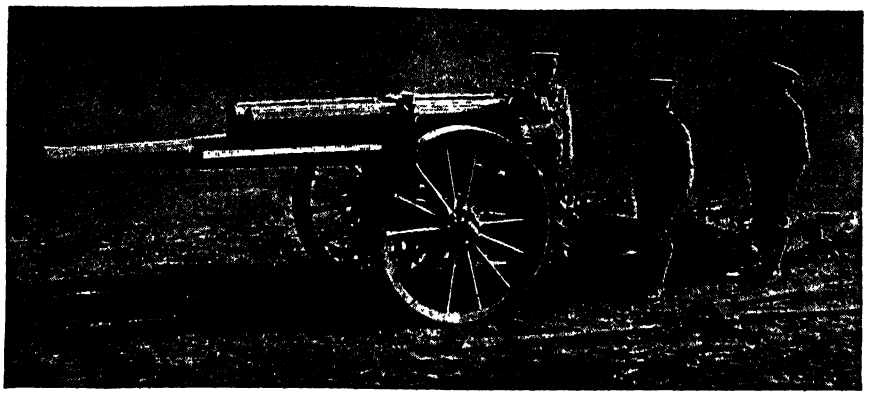
O western wind, do you think it was fair
To play such tricks with her floating hair?
To gladly, gleefully do your best
To blow her against the young man's breast,
Where he as gladly folded her in;
And kissed her mouth and dimpled chin?

A TEMPLE LIKE A JEWEL-BOX



India has the most beautiful buildings in the world, and this picture of the Jain temple at Calcutta helps us to realize the great wonder of this ancient empire. The temple is built chiefly of white marble, and every square foot of the surface is decorated as if it were a jewel-box. The posts of the gateway, the wall-spaces, and the front are covered with mosaic made of millions of square pieces of marble and glass; and this glass reflects the light, so that when the sun is shining upon it the temple seems to be covered with diamonds.

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WHY DOES A POP-GUN GO POP?

CONTINUED FROM 2086

THE "pop" of a pop-gun is, of course, a sound, and all sounds are waves of a particular kind produced in air or in other things. If they are to be what we call sounds they must be the kind of waves that our ears are able to hear, and these are special, differing from waves of wind, because they are very short and quick.

The question, then, really is: How does the pop-gun cause the kind of air-waves that we can hear? And the answer is that air inside the gun is compressed and then suddenly released, when the gun goes off. As it is released, it naturally expands or spreads itself out again to fill the space it filled before it was compressed. This means, of course, that it gives a quick push, as it expands, to the air on all sides of it, and so it starts the wave of air, which spreads out in all directions from the point where it started, and reaches our ears. The kind of wave is one which our ears hear as a very short, sharp sound. It is short because the cause of it acts for only a very short time, and the sound of it is best represented by the word "pop."

IS THE WORD POP AN EXPLOSION?

Pop is one of the many words which were invented in imitation of sounds. We use the word "explosion" to indicate the kind of sound that is made in a case like this, when a gas suddenly expands from a smaller to a larger space, and so causes a wave in the air.

Now, if we notice what we do when we make the letters p and b, we shall find the reason why students of letters call these the explosive consonants. They are both produced by explosions, and if you say *both produced* or *biped*, you will notice that the explosion is rather less for b and rather more for p; that is all the difference between them. But the present question is whether we are strictly right in calling p and b explosives. The answer is "Yes," for in making these consonants we actually make little explosions; we do exactly the same as when we fire a pop-gun. We squeeze or compress the air in our mouths, and when we have done that we allow it to force itself through between our lips, which we began by closing. Try to say p or b with your mouth open!

Then the compressed air escapes explosively, as in the pop-gun when the cork flies out, and starts a wave in the air which we call p or b, according to the suddenness with which the air escaped. A p may be soft or a b loud, but that depends on what happens in the voice-box. The

difference between the two, whether loud or soft, depends only on the suddenness of the explosion. So we learn that these consonants are called explosives not merely because they are like the sounds of little explosions, but because they *are* the sounds of little explosions.

WHAT MAKES THE LOUD NOISE WHEN A GUN IS FIRED?

This noise also is due to an explosion, the sudden expansion of a compressed gas, as it escapes into the air from the space in which it was confined. Now, in a pop-gun, or in the case of the explosion that forms the letter p, the gas that is compressed and then allowed to expand is air which already exists as air. But there is no air or any other gas in a cartridge, and the question is: Where does the gas come from that makes the noise and fires the bullet when a gun is fired—just as you may fire a drop of saliva from your mouth sometimes when you say p very forcibly?

What happens is that we suddenly burn a powder which we have prepared of materials such that when they are burnt a large quantity of gas will be produced, and it must be produced very suddenly, if the full explosive power is to be obtained. We have another great advantage in trying to make this kind of explosion, as we have not when we fire a pop-gun or say p. That is that the gases produced are exceedingly hot, for they are heated by the burning which makes them. A hot gas naturally occupies a great deal of space—far more than a cold gas, and so when we fire a gun we suddenly produce a great quantity of very hot gas in a very tiny space, which is not nearly sufficient to hold it. If this were done in a closed box it would burst the box, but in the case of the gun we have prepared a way out for it—only that we put a bullet in the way. Out comes the gas, driving the bullet before it, and as it expands it starts the wave of sound we hear.

OF WHAT IS GUNPOWDER MADE?

Modern gunpowders are very different in many ways from the old gunpowder that was used for so many years without any change. Nowadays we make smokeless powders and all sorts of "high explosives," as they are called, which are very different in composition from ordinary gunpowder. But in all cases the principle is the same. It would not do to admit air to the powder, because we should require a channel for the air, and the explosion would occur through that channel. Also, air is only one-fifth oxygen, and the nitrogen would be of no use. We must have our oxygen *in* the powder. That is done by using such a thing as saltpetre or nitre, which has a great deal of oxygen in it. Just as chalk has oxygen in it, so has nitre, and it has the advantage that it very readily gives off its oxygen to anything that will take it.

Also when nitre is decomposed the nitrogen in it gets free, and this nitrogen, besides requiring room for itself in any case, is made very hot by the burning that has occurred, and so requires much more room than it would if it were cool. Next, we must have something to burn, and that is supplied by charcoal, which is carbon, and by sulphur or "brimstone." These take the oxygen from the nitre very quickly, especially as the oxygen given off from one of its compounds is specially active in combining with other things, as we have seen in another part of this book.

Thus the gases which cause the explosion when they expand are carbonic acid, sulphur dioxide, and nitrogen, together with small quantities of other gases, while the potassium of the nitre is left, combined with other things and forms what must be cleaned out often if the gun is to work well. The invention of this mixture—carbon, sulphur, and nitre, called gunpowder—was a great event in the history of war, which it completely changed.

WHAT IS SMOKE MADE OF?

There are many different kinds of smoke. The gases that are produced when a gun is fired are not smoke, for smoke is never a gas, but a mixture of finely divided *solid* matter suspended in air. In the case of ordinary gunpowder we get least smoke when the proportions of the various things in the gunpowder are nicely balanced. If there is too much of anything in proportion to the others it will not be used up, but will be driven out as smoke; and in any case there is some smoke with ordinary gunpowder, which is by no means the best mixture that can be obtained for the purpose.

The smoke of towns is mainly made of particles of carbon, but a special objection to it is that it is oily, and so sticks to things and catches dirt. The exact composition of smoke depends, of course, on what is burnt, and on how it is burnt. The smoke from a wood fire is very different from that of a coal fire; and in either case the amount and the composition of the smoke largely depend on the temperature of the fire.

The hotter the fire the better and more complete will be the burning or combustion of the fuel. We have all noticed how, when a fire has just been lit, and so is not yet very hot, dense clouds of smoke arise from it; but when the fire is well going, and burns hot and clearly, it produces very little smoke. Also, much less smoke is formed from certain kinds of coal than from others, and much depends on the supply of air to the fire. All these points are very important on account of economy of fuel, the heat produced by the fire, and the injury which smoke in the air does to human beings as well as to all animals and plants that have to breathe it.

WHICH IS THE MOTHER—THE HEN THAT LAYS THE EGG, OR THE HEN THAT HATCHES IT?

You might almost as well ask which is the mother, the woman who gave birth to the baby, or the fire that keeps it warm, or the cow that gives it milk when its mother cannot? And yet the question is well worth asking and answering, for there are two parts to being a complete mother. One is bodily, or physical, and is, of course, the *real* motherhood. It is the real motherhood, for the chick that develops from the egg really gets its life from the hen that laid the egg, as does the baby from its real mother. Both egg and baby require more "mothering" of a kind, and that is why we may say that *complete* motherhood has two parts; but we see which part is more important, when we remember that it is quite easy to hatch a hen's egg by putting it in a box that is kept warm. This is called an incubator, and so your question might almost run: Which is the mother, the hen that lays the egg, or the warm box that hatches it?

Among human beings the second part of motherhood, though not the real and bodily part, is more important than among any other creatures; for babies are more helpless, and are longer helpless, than any other young creatures, and so need more care. So we must say that though the real mother is she who gave birth to the baby, yet we can call her a complete mother only if she cares for the baby after it is born; just as the hen who lays the egg and then takes care of it, and of the chick afterwards, is a more complete mother than the hen which only lays the egg and then does nothing more for the young and needy life that is within it.

IS THE EARTH HOLLOW INSIDE?

Though no one has ever seen, or ever can see, the inside of the earth, we are perfectly certain that the answer to this question is "No." We know that the earth has a solid crust, very thin, and very apt to crack and "buckle," producing such things as mountain chains in consequence, and we can prove that this crust must be utterly different from what lies underneath it. Now, one of the many ways in which we can learn about the inside of the earth is by weighing the earth, and noting its weight in comparison with its size. This teaches us what the density or denseness is of the stuff that makes the earth, and the result is a conclusive answer to the question.

If you had given you a small ball which weighed tremendously heavy—far heavier in proportion to its size than any ball you play with—you would not suspect it of being hollow, but rather you would wonder how it came to be so tightly packed and squeezed together. That is the case with the ball we call the earth. Its denseness is very high indeed, and the material in it is packed and squeezed together with more tightness than we can imagine. We have just scratched the surface of the earth, we human beings, and already, in going down even such a tiny distance, we find the density increasing, as it must, if we think of the weight that lies over us at the bottom of a mine. Certainly, then, the earth is not hollow inside, but really the very opposite of hollow!

ARE OUR BODIES HOLLOW INSIDE?

The answer to this question really goes with the answer to the last, and, for the same reason as in the last case, the answer is "No." The pressure to which the inside of the earth is subjected prevents it from being hollow, and the pres-

sure to which the inside of the body is subjected prevents it from being hollow. We know that there are tubes in the body, and bags, such as the stomach; and everyone is apt to think of the stomach before a meal, when we say we feel "empty," as if it were a bag with a hollow space inside it.

But it is never anything of the sort. The whole body is subjected to the pressure of the atmosphere, squeezing it on all sides, and the consequence is that when the stomach, for instance, is empty, its walls are always squeezed firmly against one another by everything that is in their neighborhood. The whole body and all the organs in it, whether solid or hollow, are packed tightly together, with never a chink or a gap or an empty place anywhere. It used to be said long ago that "Nature abhors a vacuum"—*vacuum* is Latin for an empty place—and this means that there are really no empty places anywhere, for Nature always fills from without any space or place that we try to make empty. This applies to the earth or the air or the sea or our own bodies; and even when we make what we call a vacuum by scientific means, it is really crammed full with the ether, which is absolutely everywhere, even in what we call empty space.

WHAT KEEPS TRAINS ON A TOPSY-TURVY RAILWAY WHEN UPSIDE DOWN?

Of course, the puzzle is that when the train is upside down there seems to be nothing to act against the force of the earth's attraction, which is always pulling on it. Now, the train does not fall, and we are certain that gravitation is always acting, and *must* pull the train straight back to the earth if nothing acts against it. There, therefore, must be some other force acting which is powerful enough to act against gravitation so as to keep the train on the rails.

Exactly the same thing is seen when we swing a pitcherful of water round on a chain, without spilling the water. What keeps the train on the rails, or the water in the pitcher? Now, we know that if the train stopped moving when it was upside down, or if the pitcher was similarly stopped, train or water would fall. Therefore the force we are looking for, that balances the force of gravitation, must be somehow *in the motion* of the train or the water.

And so it is. Anything in motion has force in it, as we know when someone bumps up against us. Now, this force acts in the line in which the thing is moving. But when a thing moves round and round, this force is still working in a straight line, so that the thing always tends to fly away from the circle in which it moves. This force has the rather hard name of *centrifugal* force, which means the force that flies away from the centre of the path in which the thing moves. It is this centrifugal force, produced by its motion, that always presses the train against the rails in any part of its course, or the water against the pitcher. It is this force also that keeps the earth from falling into the sun; and if train, or water, or earth were stopped in its course, or did not go round quickly enough, each would certainly fall—to the ground in the first two cases, and to the sun in the last case, and all for the same reason. These great laws act in big and little things alike: "The law that moulds a planet rounds a tear."

WHY DO HOUSES SEEM CROOKED WHEN WE LOOK ABOVE A STREET FIRE?

Light is always bent in some degree by the various things through which it passes—as when it passes through the air to our eyes from a star, or as when a stick, half in water, seems to be bent. Now, so far as light is concerned, the air is different according to its warmth. Warm air is less dense than cold air, and when light passes from one to the other, in either direction, its path is more or less bent. So when we look at the houses through the hot gases that rise from a watch-fire, the light, as it travels from the houses to our eyes, is bent in passing from the cold air through the hot gases, and is bent a second time in passing from the hot gases through the cold air again.

Also, as the fire does not give off the same quantity of gas at every moment, the light is bent in different ways, and not only do we see the houses crooked, but they seem more or less crooked as we keep on looking at them. This bending, or breaking, of the rays of light as they pass from one thing to another is called *refraction*, which simply means breaking, and is very important in every way. Just as you see the houses crooked when you look at them through the gases from a fire, so we see all the stars crooked when we look at them through the air. The light from the stars is bent as it passes

through the air, and so we do not see stars where they really are, but always a little distance from the real place, because of the *refraction* of their light.

WHAT IS IT THAT CAUSES AN EARTHQUAKE?

The first reason that probably accounts for all earthquakes is simply that the earth is shrinking as it gradually loses the heat from its surface. We know that the earth has a very thin crust, which is comparatively cool, and a very hot inside. The crust rests upon the inside of the earth, and as the inside shrinks it is bound to leave parts of the crust unsupported, so that they are apt to sink or crack. This will happen especially where the crust of the earth is thinner and more liable to crack than in other places. It is very common in Japan, for instance, and very rare in England.

But when an earthquake happens at any part of the earth, it starts a wave of disturbance that travels right over the earth, and can be detected anywhere if we look out for it. Then, if we notice the time when the wave reached a place, and find out what the time was when it started, we can learn how quickly the earth-wave travels. But sometimes no one knows where the wave started, and then, very often, we can guess that it started under the sea; for earthquakes may start in the earth's crust where it forms the beds of great oceans as well as anywhere else. And so there may be earthquakes at the bottom of the sea.

WHY DO WE SHIVER WHEN WE ARE VERY COLD?

There are more good reasons than one why we shiver when we are cold. The machinery of it, as we may say, is that cold, *at first*, rather excites and disturbs the nervous system, just as heat usually soothes it. We notice these contrary effects of heat and cold in the case of a warm bath and a cold dip. This, of course, is not to say that shivering is at all the same thing as the feeling of activity we have after a cold dip; but in each case the cold has been what is called a stimulant. But now we have to ask whether the shivering is of any use to us, or whether it is a wholly useless and purposeless thing; beyond any doubt it is possible to show that shivering serves the purposes of the body just as hunger does, and just as even fever often does, though we think of these as things rather bad in themselves. One good reason for shivering is that it makes us aware of cold as we might not otherwise be, and so we can protect ourselves. After the first stage of its action great cold sends the brain to sleep. Shivering perhaps serves to keep the brain awake and make it aware that something must be done.

DOES SHIVERING FROM COLD HELP TO MAKE US WARM?

I think that a very good reason for shivering can be found. Whenever a muscle works, heat is produced; indeed, a very great part of the heat of the body is made in the muscles, which have been called "the fireplaces of the body." Shivering consists of small, quick, to-and-fro movements, sometimes almost quite regular, as when our "teeth chatter," of most or all of the muscles of the body. Now, though shivering often makes us aware that we are cold, yet it really helps to keep us warm, for all these little muscular movements are producing heat. So we may say that when a person, by keeping still, refuses to work his muscles so as to keep warm, the brain takes the matter into its own hands and does what little it can, in spite of him, by setting his muscles shivering.

WHY DOES EVERYTHING SPIN ROUND WHEN WE ARE DIZZY?

When anyone feels dizzy, and perhaps almost about to faint, his brain cannot properly control the working of his eyes. They may move round from side to side, perhaps independently instead of together, and so it may look as if things were spinning round. Another reason for dizziness has to do with a wonderful part of the body near the ear, and without which none of us could sit upright, much less stand, though few people have ever heard of it. This organ, which used to be thought to have something to do with hearing, really controls our balance. In some people it suffers from a disease, and these people constantly suffer from dizziness and a feeling that everything is spinning round and round.

As every child knows, we can make ourselves dizzy, and can think that everything is spinning round, by turning round ourselves several times in one

direction. This disturbs the organ of balancing, about which we have been speaking, and this disturbance it is that gives us the feeling. If you turn round the other way you put things right, by restoring the original state of affairs within the balancing organ. The name for the feeling that things are spinning round is *vertigo*; and *vert* simply means *turn*, as in such words as convert, invert, and others.

WHY IS IT THAT FLAMES NEVER GO DOWN, BUT UP?

We might think, if we had not noticed, that this question was not true, and that flames only go upwards because a gas-jet, for instance, is always directed upwards. But the question is quite true, even in the case of a gas-jet that is directed downwards, for we find that then the flame turns upwards. If we *must* have a flame going downwards or sideways, then we must have a draught to blow it, just as the wind will blow the flame of a match in any direction. This can be done in certain burners by turning the hole where the gas comes in the direction we want, and by making the gas come out very fast. Also, in the case of a fire, there is a considerable draught of air up the chimney, helping to blow the flames up with it.

But even where there is no draught at all in any direction, and when we burn something without sending any gas in any particular direction through a hole, flames always go up, and never down, as the question says. And the reasons are: First, that the gases made in the flame are very hot, and, as hot gases are always much lighter than the cold gases that make up the air around them, the hot gases of the flame tend to rise; and secondly, every flame, as the hot gases go upwards because they are so light, *makes a draught for itself*. As the hot gases go up, the space they leave is filled from below, and this goes steadily on, and so makes a draught.

IS THERE ANY USE IN THE WAY HOT GASES RISE?

A gas-jet, properly used, may actually help to ventilate a room by making a draught; and every fire does the same thing, by increasing the natural draught going up the chimney. If hot gases did not rise, I do not see how we should live, nor how anything—a fire, or a gas-jet, or anything else—could go on burning for more than a second or two. The gases which are produced when anything burns are themselves burnt, once and for all; they can neither be burnt again, nor can they help to burn anything else. Their life and power, we may say, is ended for ever.

These gases consist chiefly of carbon dioxide and water-vapor. They are both of them completely oxidized—the carbon of the one and the hydrogen of the other are combined with all the oxygen they can hold. Nor will either of them give up its oxygen for the burning of anything else. Thus, if hot gases did not rise, and so make room for fresh air—which really means fresh oxygen—nothing could burn for long; for nothing can burn in an atmosphere of carbon dioxide and water-vapor, and such an atmosphere would at once surround every burning thing if hot gases did not rise.

WHY DOES OUR BREATH RISE IN THE AIR?

Exactly the same is true of breathing as of hot gases, as explained in the last question. If the carbon dioxide and water-vapor that leave our lungs hung round the nose and mouth, we should have to breathe them in again at the next breath instead of breathing in fresh air, and so we should certainly in the end be suffocated.

Instead of that, they obey the law of hot gases, and rise out of the way at once, so that when we breathe in again there is fresh oxygen ready for us to use. Of course, we can defeat Nature, if we are so foolish, by cooping ourselves up in close rooms, perhaps with very low ceilings, so that the gases we breathe out can scarcely get away at all from the neighborhood of our noses, and so we breathe breathed—that is, already burnt—air; and this is one reason why people get sleepy, and even faint, in badly-ventilated places.

We can also defeat Nature—at any rate, to some extent—by other means. For instance, we can put the bed next a wall, which hinders the gases of breathed air from getting freely away. Beds should, if possible, be away from a wall. If not, they should be placed so that the wall is not on the side on which the sleeper usually lies.

And the question about the bed-clothes suggests a way in which we can interfere with our breathing—a way of which

children especially are rather fond, as sometimes they feel safer in bed in the dark if their ears are covered.

Is it good to sleep with the bed-clothes over the face?

Mothers and nurses sometimes get anxious about this, for they think—and quite rightly, too—that a child, or anyone else, should have its nose free when it is asleep, and not covered with the bed-clothes. But if they will watch a sleeping child, they will see that though often the child starts to go to sleep by covering its face up, yet *always*, when it is asleep or nearly asleep, the child's body will do the rest for itself, and the head will be moved until the nose gets free of the clothes, so that fresh air can get to it, and so that the breathed gases can freely rise and get out of the way. So people who look after children really need not worry if children like to start the night with the bed-clothes almost over their faces. The child's brain, so soon as the child's self is asleep and cannot interfere with it in any way, will put things right.

It may be, too, that we get to sleep more easily by having the nose and mouth partly covered at first. The way in which birds and other animals go to sleep suggests this, and we can understand it at once if we remember that carbon dioxide always makes people rather sleepy, as we all notice in badly-ventilated places, such as churches and halls and crowded rooms, and almost anywhere except in the open air, or a room with open windows.

How do we know the names of other planets?

This is a question a boy would call a "corker," said the Wise Man, and I should like to go for a picnic with the boy or girl who asked it. The name of everything is something that men have given it, or else that children have given, like the names "mamma" and "dadda," which babies invented. So when we talk about *knowing* the name of anything, we really mean only knowing what some other people have chosen to call it. The name is not a natural part of the thing; the name does not matter so long as other people know what we are talking about. "A rose by any other name would smell as sweet," said Shakespeare. And the sun by any other name would shine as bright and, of course, would still be just as much the sun as ever. Indeed, before we talk about the planets, what about the name of the sun itself? We call that great bright thing "Sun," but the Romans called it Sol, and the Greeks called it Helios. If there are people on Mars they may call the sun "cat," and if they have cats they may call them "suns," for all we know, and for all it would really matter. A name is just a label.

How did the planets get their names?

The names of most of the planets are very old indeed, and they were given to them for interesting reasons worth knowing. Mercury moves very quickly, it has to, for it is so near the sun that it would be drawn in unless it moved quickly, and its name—Mercury—is after the "messenger of the gods," whom the Greeks and Romans invented and believed in. Then Venus is very beautiful and gets its name from Venus, the supposed goddess of beauty. Mars is reddish and so suggests blood, and was therefore called Mars, after the god of war. Jupiter is the biggest of the planets, and is called after Jupiter or Jove, the greatest of the gods whom people believed in long ago.

Then, to take one more instance of the way in which the planets are named, there is Uranus, now so named, like the others, after an ancient god. It was discovered by a great German, William Herschel, who lived in England, and he wanted to call it Georgium, after the King of England. Others wanted to call it Herschel, after the discoverer, which would certainly have been wiser than to name it after a king who had nothing to do with it; but finally it was agreed to give it an old name like the others.

As for Earth, the good mother of us all, the ancients called her *Ge*, and so now we call the study of the earth *ge*-ology; while what we call the moon they called Luna. Hence, we have the word lunatic, because in ignorant times it was thought that when a man's mind went out of order, it was through the influence of the moon.

Who gave the stars their names?

Nowadays we know an enormous number of stars—about 100,000,000—

and the smaller ones (or rather the fainter ones, for they may only seem small because they are distant) simply get numbers or letters, for all the world like motor-cars, in order to identify them. But the brightest stars have been known for many ages, certainly not less than 10,000 years, and the origin of their names is lost, like the names of the men who named them.

Some of these names we call Latin and Greek and Arabic, but certainly many of them are far older than the Romans or the Greeks or the Arabian astronomers, and they got the names from those who went before them, just as we have got the names from them. A star with a specially interesting name is the Pole Star, shown on another page, giving us the direction of the north. No one can say how many millions and millions of sailors' eyes, throughout thousands of past years, have been gratefully and often anxiously fixed upon that star, by which they could steer their way home across the pathless sea. But for all those sailors that star has doubtless been known by whatever word stood for north, in whatever language the sailors spoke. The names of great stars like Aldebaran and Sirius must be older than any human record. *Al* is simply Arabic for *the*, and many of our words and names beginning with al are of Arabic origin.

DO PEOPLE RISE FROM THE WATER THREE TIMES BEFORE THEY DROWN?

The answer to this question is "No," and the old story that drowning men rise three times is entirely erroneous.

Sometimes people who drown do not rise at all—as, for instance, sometimes when they strike their heads against something hard at the bottom. Usually they do rise, for our bodies are only very slightly heavier than water, and the movements of arms and legs, even of a person who is not a swimmer, will raise his body to the surface until he takes so much water into his stomach and lungs that his body gets heavier and can rise no more. It is entirely a matter of chance how often, if at all, a drowning person rises. During a diving competition at the Franco-British Exhibition in London, in 1908, a diver hit the water flat so that he was "winded." He simply lay at the bottom, for he was unconscious and could make no movements. If everyone had waited for him to come up even once, he would have been drowned, but a swimmer dived in and brought him up, and he was soon all right. Here is a case which shows us that it is never, *never* safe to believe in lies of any kind, however old or popular or pleasant they may be. When anyone is in danger of drowning we must know that it is our duty to act at once, and so we may succeed in saving a human life.

IS EVERY SEVENTH WAVE A BIGGER ONE?

Another superstition we may add to this is one which says that every seventh or every ninth wave, when the tide comes in, is bigger than the others. It is untrue and without any basis of truth. Most of these assertions about three and seven are nonsense, and are derived from long ago, when those numbers were thought to have some special value in Nature.

WHY IS THE STEAM THAT COMES FROM HOT YELLOW WATER NOT YELLOW?

This is a question that goes with those about rain, for the answer to it is the same as the answer to another question—really the same—which might have been asked: Why is rain made from salt water not salt? The answer is that when water turns into a gas or vapor—when it *evaporates*, as we say—it always leaves behind it anything that may have been dissolved in it.

In the case of the rain, the sun makes the water evaporate, but leaves behind the salt that was dissolved in it. In the case of the hot yellow water, the yellow stuff is left behind as the water turns to steam. This rule about water is of the greatest importance in Nature, for it means that, by evaporation, we are always getting fresh supplies of pure water that has nothing dissolved in it, and is therefore able to dissolve new things. We know that much of the work water does in the world is done by its dissolving things, but there is a limit to the amount of anything that even water can dissolve, as you can prove for yourself with a little water and a lot of salt or sugar. If water did not always tend to evaporate and leave the dissolved things behind it, its work of ever dissolving new things would soon come to an end. And chemists would not know

how to get pure water, except by the very long and costly method of actually making it by burning hydrogen with oxygen.

WHY DOES COLORED SOAP MAKE WHITE SOAP-SUDS?

I rather think that this question is not quite true. The first thing to find out is, what the soap-suds, or lather, are made of, and the answer is that, like foam, they are mainly made of bubbles of water. Only the soap makes the water more sticky, so to say, and thus we get bubbles which hold together, and last a long time. If the soap is yellow before it is melted, it is still yellow even when it is melted, and often you will find that the lather of a deeply colored soap has a *faint* color of the same kind. The real question is, Why is the lather so faintly colored, so *nearly* white? Directly we study soap-bubbles in general, we find the answer to this question. The film of water (and soap) that makes a soap-bubble is extremely thin; indeed, it is one of the thinnest things in the whole world. Now, since it is so thin, the amount of soap and coloring matter in its wall is very small, and that is why its color shows so little. A single "red" blood-cell is only a faint yellow in color, but when we see millions of them together they look bright red. So with other things. When light passes through a very thin layer of any colored thing, or when light is reflected from a very thin layer of such a thing, the color is only slight, and faint. The white light is only just a little changed.

HOW DOES SOAP TAKE THE DIRT OUT OF THINGS?

The answer to this question has been a great deal argued by chemists, and of course it is a very important thing, for cleanliness is very necessary, and enormous quantities of soap have to be used, and it is well that we should know how soap does its work, so that we can make the soap that works best.

Now, it is fat or oil that especially makes things dirty—everyone knows how oil catches dust and makes a mess on one's hands and clothes. It is the oil that comes out of the skin, especially out of the head, where the hair is, that makes us so quickly dirty; and the same applies to other things. Now, if only we can melt or get rid of the oil on things, we soon make them clean, and the real use of soap is that, somehow, it disposes of oil. It does this, we now know, in at least two ways. Most soaps have in them a great deal of something we call alkali. This alkali simply dissolves the oil that gathers on things, and so it makes them clean. But soap takes the dirt from things in another way, as we know when we use soaps that have no alkali in them at all. It has the power of breaking up oil into a number of very tiny little drops, which are easily washed away, together with all the dirt that the oil has caught and collected.

A collection of very tiny drops of oil, held in some other fluid, is called an *emulsion*. Water alone will not form an emulsion of any oil, because oil and water will not mix. That is the reason why we cannot wash well with water alone. But when water has soap dissolved or melted in it, it is able to make an emulsion of the oil on anything we are washing, and so makes it clean.

WHY DOES AMMONIA CLEAN THINGS?

Ammonia is really a gas, but, like other gases, it can be dissolved in water, and it is more *soluble*, as we say, in water than almost any other gas. The solution of ammonia gas in water is what we usually call ammonia, and it is very largely used for cleaning things. Indeed, many people add what is called, not quite correctly, "liquid ammonia" to the water of their bath, for they find that it helps to make them very clean. "Liquid ammonia" is not a correct name, because what we call that is really water containing a lot of ammonia gas dissolved in it, as we have already seen.

Ammonia cleans many things far better than even strong soft soap, but it is so powerful that we cannot use it for everything. The reason why ammonia is such a splendid cleanser is, first, that it is an alkali, and so dissolves fats and oils, as we have seen that the alkalies in ordinary soap do. But ammonia is different from all other alkalies, because it is really a gas, and the great fact about a gas is that, if it gets "half a chance," it goes everywhere. Ammonia is thus the most searching of cleansers; not a speck of oily dirt, however well hidden, can escape it.

THE NEXT QUESTIONS BEGIN ON PAGE 2349.

WHERE THE CHOCOLATES COME FROM





The picture on the left is a very close view of the cocoa-pods growing out of the stem of a tree in a plantation in Ecuador, one of the countries where this tree is grown. It needs a hot climate, a deep, rich soil, and much moisture. When the Spanish crossed the Atlantic they found the natives using cocoa, and they introduced it into Spain, where it is a favorite drink. The native on the right has split one of the pods.

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A STICK OF CHOCOLATE

CONTINUED FROM 2127

SHE came out of the shop with the end of the stick in her lips.

"What are you eating?" someone asked her.

"Chocolate," she said; and a little brown rivulet trickled from her lips to her chin.

"What is chocolate?"

She thought for a moment, and then answered with great positiveness:

"Something good to eat."

Someone took her hand, the hand that was not brown with chocolate, and walked away with her across the village square to the salt marshes beside the sea.

"Once upon a time," he said, "there was a man named Christopher Columbus, who discovered a great continent called America, and discovered in this great continent a little tree called the cacao-tree. There was something very strange about this tree: it grew buds, fruit, and flowers all the year round, and all at the same time. The Indians who inhabited America gathered the pods of this tree, split them open, took out the beans which they contained, dried them in the sun, and nibbled them just as you are now nibbling your penny stick of chocolate. Columbus went back to Spain with some of these beans in his pocket. Many years after, on June 16, 1657, a day which every boy and girl ought to observe as a sacred feast, there appeared this notice in an English newspaper called the 'Public Advertiser':

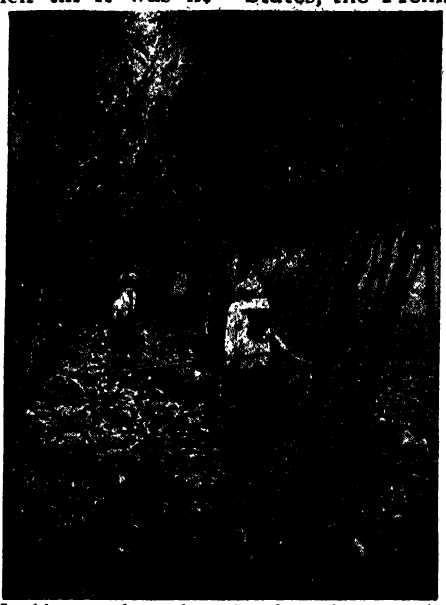
"In Bishopsgate Street,
in Queen's Head Alley,
at a Frenchman's house,
is an excellent West Indian drink called
Chocolate, to be sold,
where you may have it ready at any time,
and also unmade,
at reasonable rates.

"Fifty years after chocolate was the fashionable beverage of England, and restaurants began to appear in every town with the name, which you may still see, The Cocoa Tree. Aristocratic England drank the great drink of poor ignorant Indians. And now hundreds of boys and girls the world over are going into candy stores with pennies, and cents, and sous, and pfennigs in their hands, and coming out with the poor Indians' chocolate in their mouths.

"Now, if anyone asked you who was the greatest man that ever lived, would not your chocolate-stained lips hurry to exclaim, Christopher Columbus?

"And when you taste your chocolate, you should think of how that beautiful brown fluid on your American tongue was once a little bean tucked in a comfortable pod growing on a little tree thousands of miles away; and of how a native, singing a song, came with a long pole, which had a kind of scissors at the end, and nipped off the pod, and left it on the warm earth for a day; and of how another native, in a straw hat and striped linen trousers, came and split that

pod, and took out the very bean you are chewing, put it in a basket and, singing about his children, carried it away to lie in a trench till it was fit to pack in a box, and go aboard a mighty steamer, and make the long journey to be roasted in the factory. If you had gone to buy that bean where it grew, instead of waiting for a ship to bring it to you, it would have cost you not a penny, but about $250."



In this cocoa-bean plantation the natives are cutting the pods from the barks of the trees. In the picture on the previous page they are opening pods.

She looked up and smiled.

"I've got nearly fifteen dollars in the savings bank!" she said proudly.

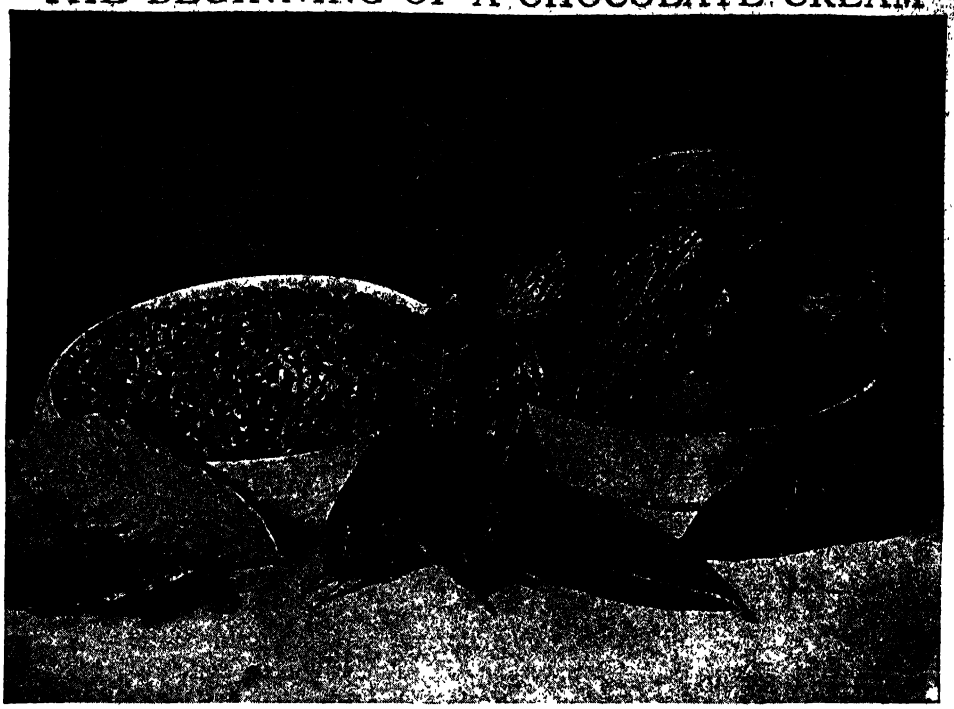
"My dear, you are a very important person. Your penny employs thousands of laborers, and shipbuilders, and railway engineers, box-makers, sailors, porters, and factory hands. If children stopped eating chocolate there might be a panic on the Stock Exchange, the Paris Bourse, and the Dutch money market. But there are many others besides you. The Prime Minister of England, the President of the United States, the Premier of Canada, Admiral Lord Fisher, Mr. Roosevelt, nay, King George the Fifth, Emperor of India and of the Britains Beyond the Seas—once upon a time they walked into candy stores and spent their pennies on sticks of chocolate. Bullseyes have their charm, butter scotch is delicious, there is no question that caramels at certain seasons of the year are superb; but chocolate is universal and eternal. Every old gentleman in the world at some time has eaten chocolate. Perhaps that very stick that you have now quite eaten grew on a tree which sent chocolate to Queen Victoria in Windsor Castle, or perhaps the fruit of the same tree has traveled into every country across the sea."



The work of drying the beans, which is being done in the garden seen above, is undertaken immediately after they have been extracted from the pods. The beans are exposed in shallow boxes to the blazing sun, and are from time to time turned over so that all the beans get the heat. These pictures were taken in Ecuador.

Photos, copyright by Underwood & Underwood, N.Y.

THE BEGINNING OF A CHOCOLATE CREAM



These are the cocoa-beans as you see them when they arrive at the factory. They grow in pods, looking like cucumbers, on trees in the West Indies, in the hottest parts of America, and in Africa. The pods seen on the right, have to be opened, and the beans are taken out and dried. On the left of the picture we see the beans.

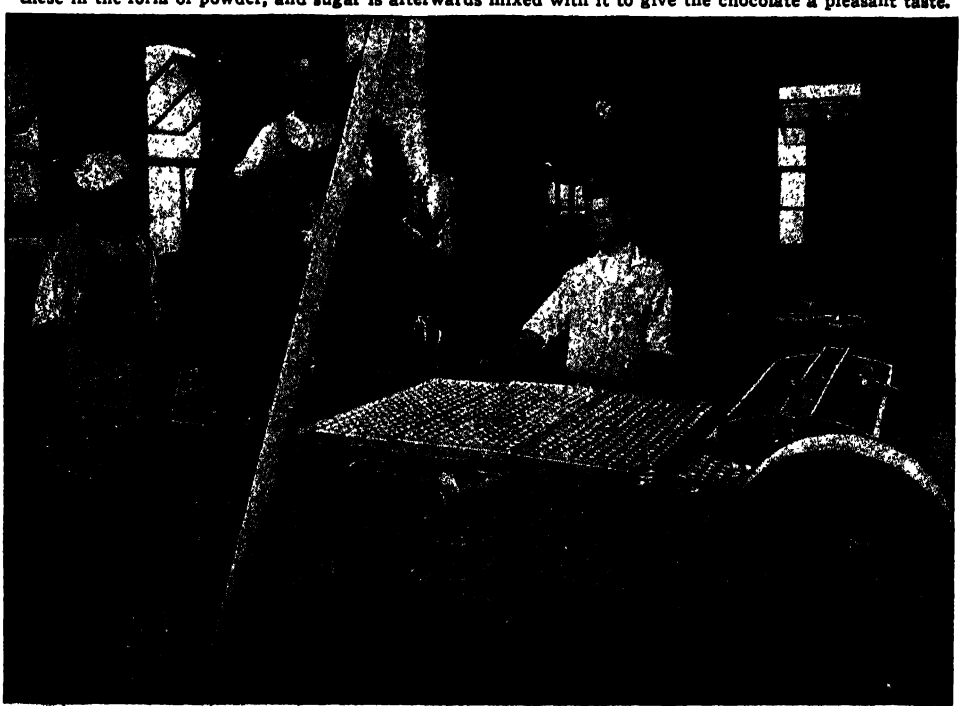


The cocoa-tree belongs to a family of trees called by a Greek name meaning "food for the gods." We should not think the cocoa-bean food for any human being if we tasted it in its natural state. It is then oily and bitter. We improve it first by thoroughly roasting it. This picture shows the man roasting the beans.

FROM GRINDING MILL TO CHOCOLATE MOLD

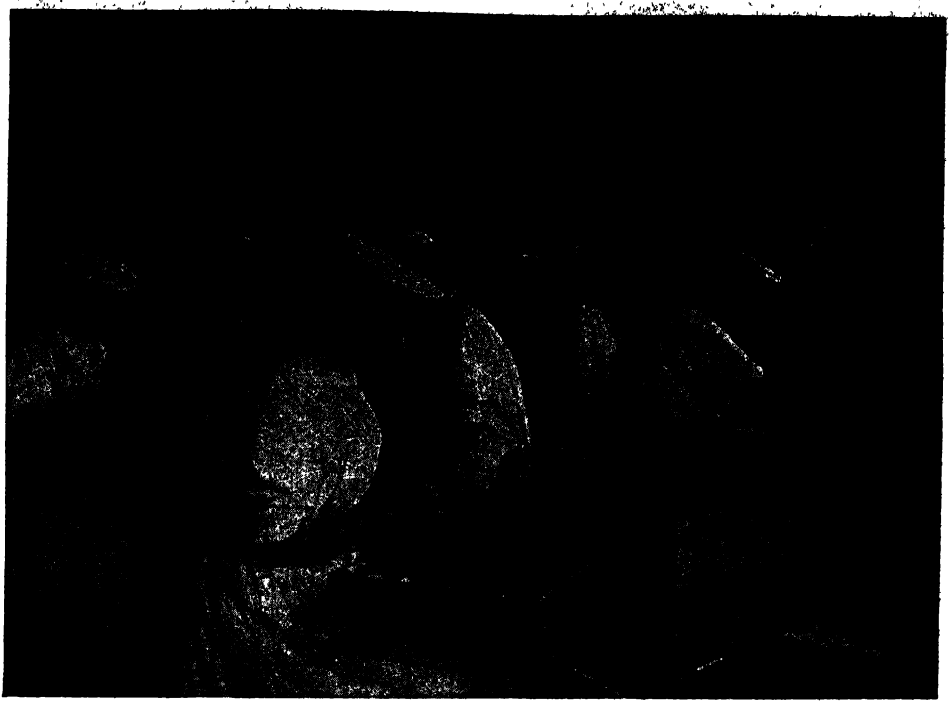


When roasted and broken up, the bean will make either cocoa to drink or chocolate to eat. Here chocolate is being made for our candy stores, so the baked bean is ground in mills. The beans come out of these in the form of powder, and sugar is afterwards mixed with it to give the chocolate a pleasant taste.

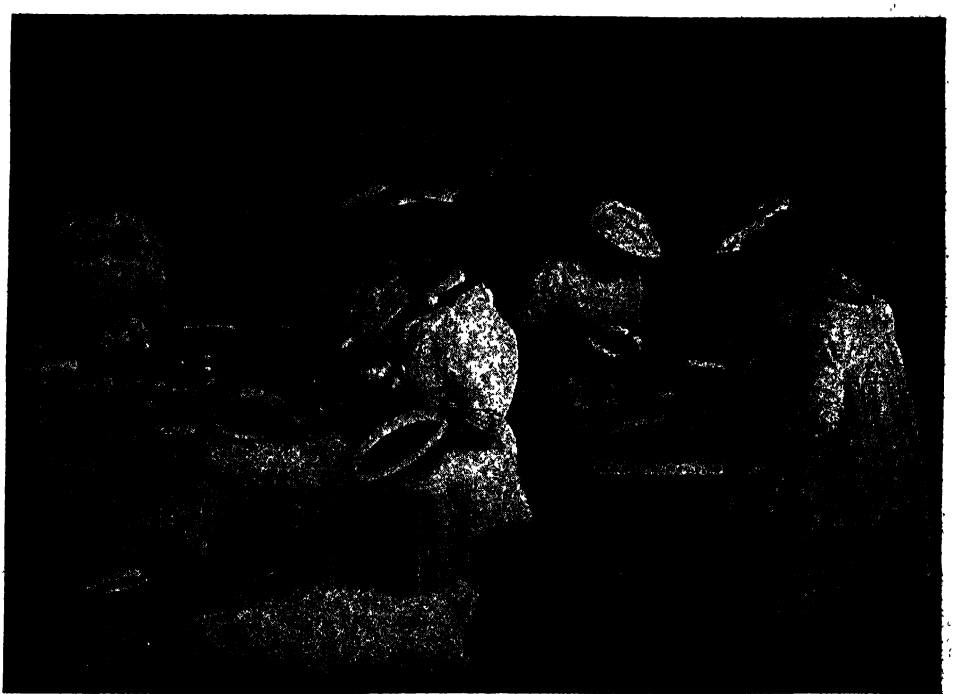


If solid chocolate sweets are wanted, the powder and sugar are melted together. Molds of starch are prepared in sections and run under this tank into which the man is pouring a pail of the mixture. On the left a man is removing a section of molds which have been filled. When cool the candies are taken out.

WHERE THE EASTER EGGS COME FROM

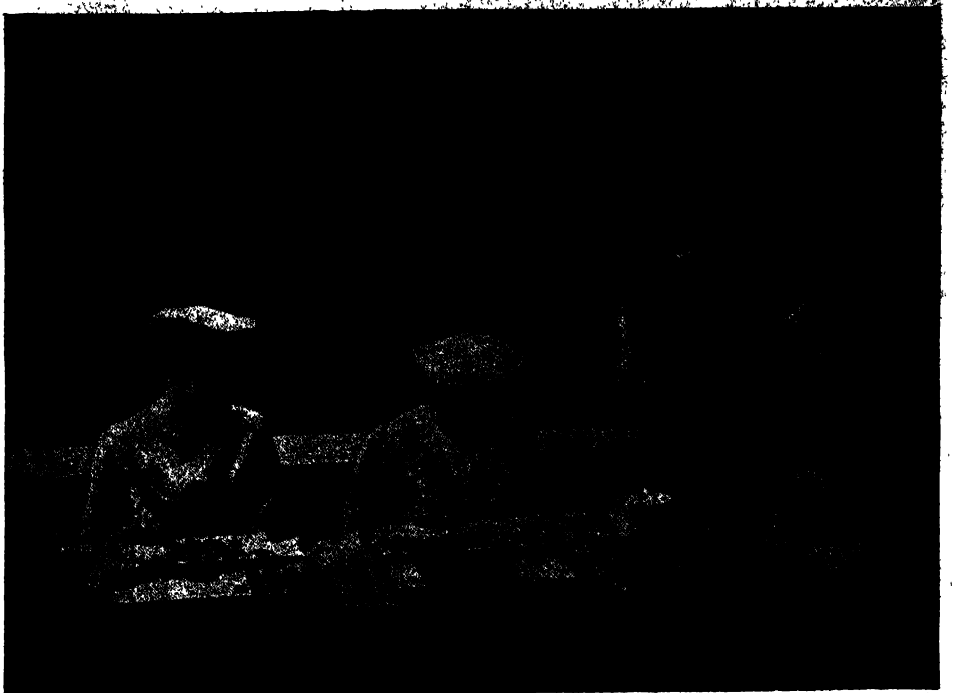


The chocolate serves for many sorts of candy. Almonds and other nuts are used, and dainty pastes, made into balls, are here being dipped into the chocolate, which forms a smooth and pleasant coating over them.

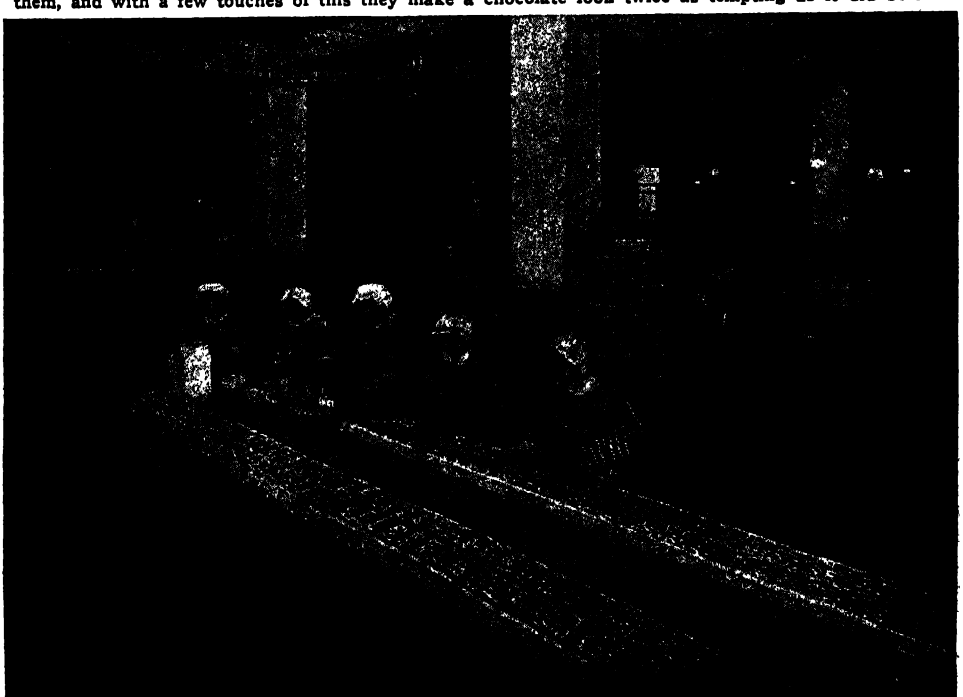


The girls are here making chocolate Easter eggs. They are fitted with hoops of smooth white cardboard, which will make the two halves of the egg fasten together, so that pretty presents may be put inside.

MAKING THE CHOCOLATES LOOK TEMPTING

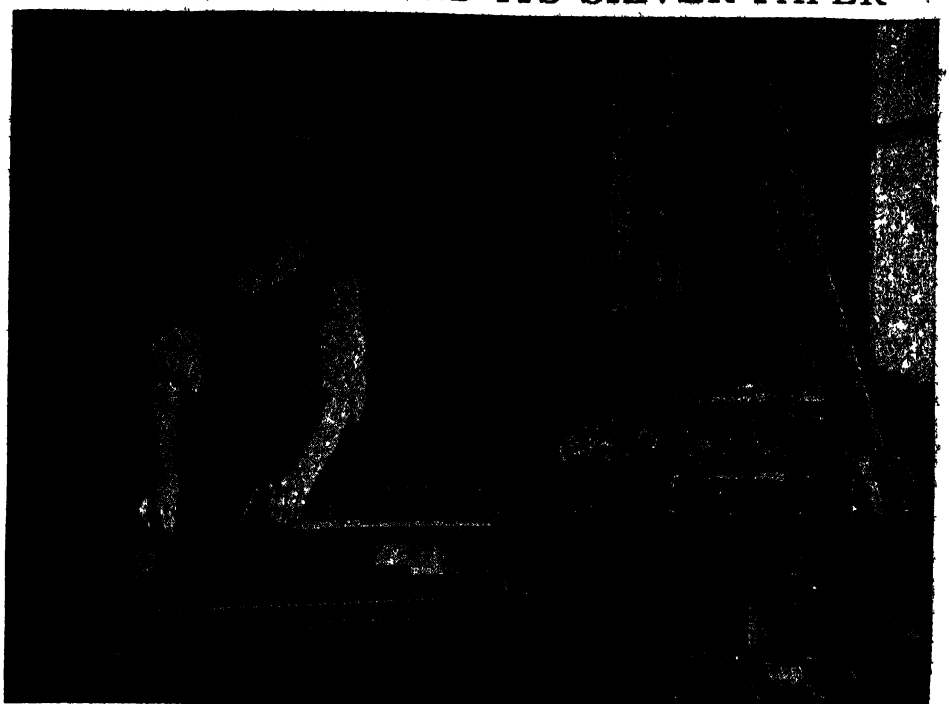


Good candy must please the eye as well as the palate. The girls have basins of liquid sweetstuff beside them, and with a few touches of this they make a chocolate look twice as tempting as it did before.

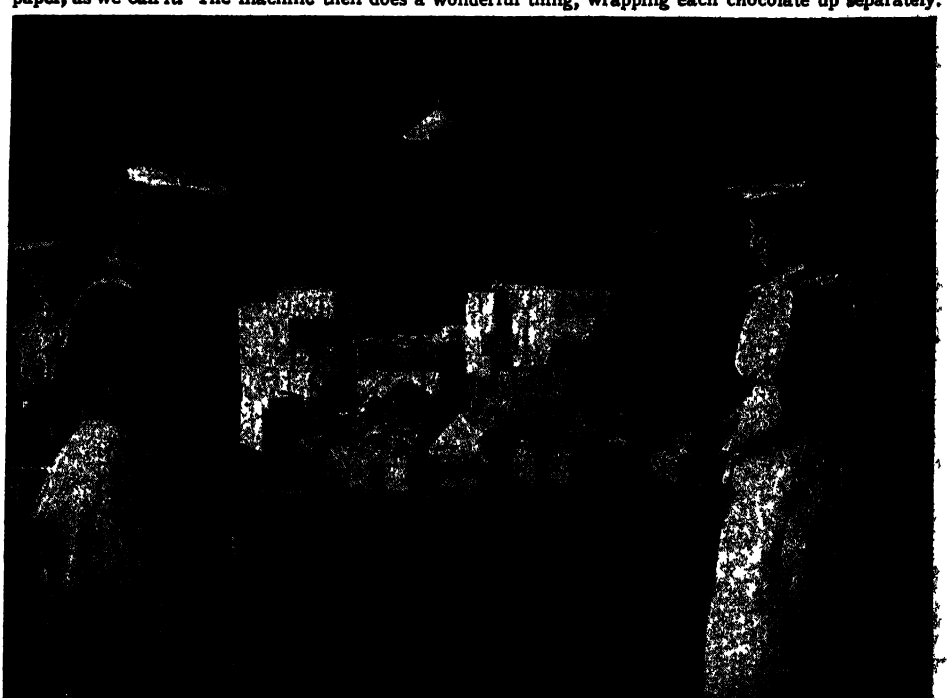


You have noticed that boxes of a certain size and price are much alike. Here you see them being packed. Girls with large boxes of particular kinds of candy place the same number of one kind in a box. Then they get other kinds, and so on until the small boxes are full. Other girls weigh and wrap the boxes.

THE MACHINE AND ITS SILVER PAPER



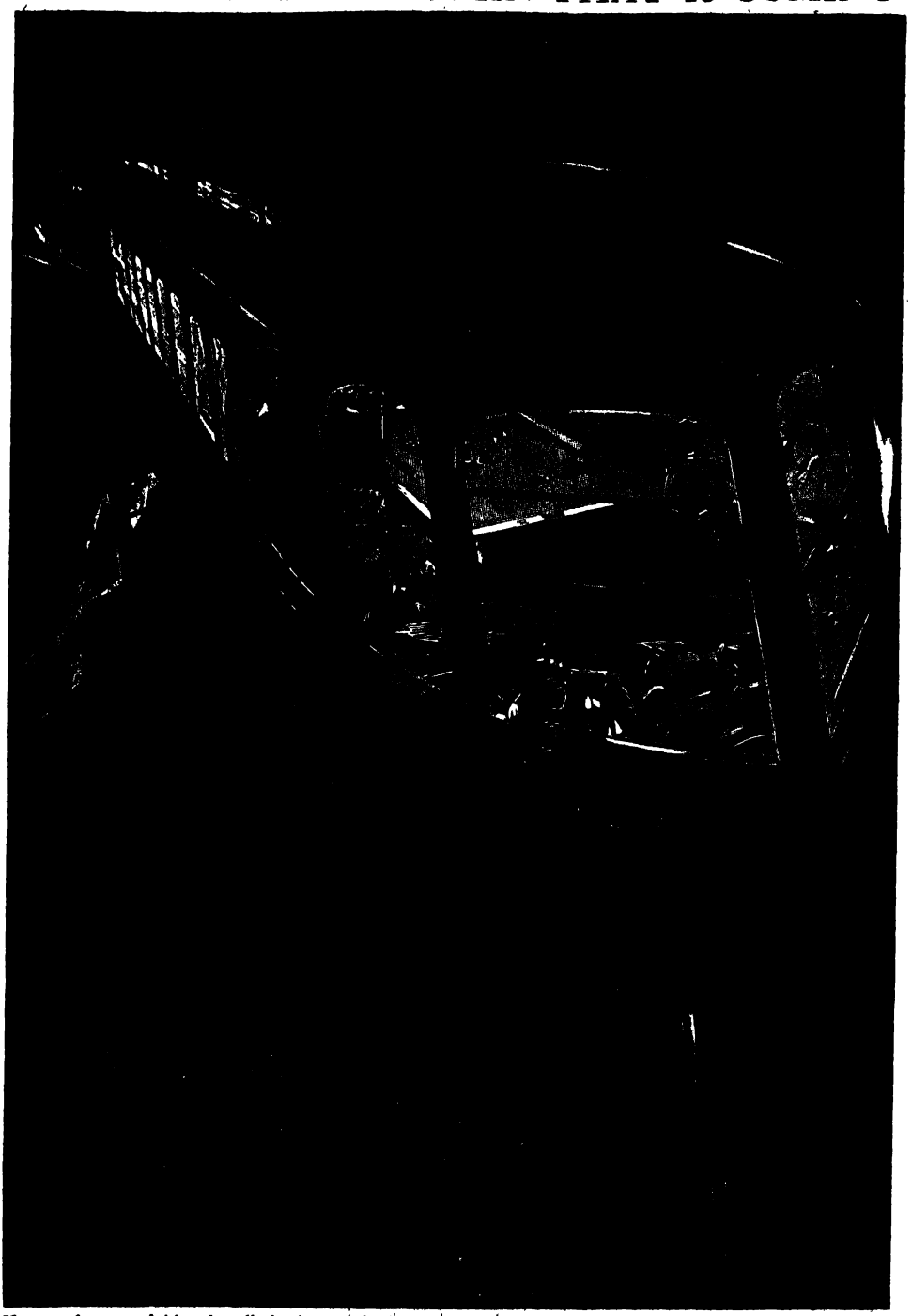
One of the most interesting parts of the packing up of the chocolates is done by this machine. A girl places the chocolates on a moving band, which carries them along the machine to a ribbon of tinfoil, or silver paper, as we call it. The machine then does a wonderful thing, wrapping each chocolate up separately.



The packers of chocolates do not forget that the eye as well as the mouth must be considered. Good chocolates are always pleasant, but seem more so when done up in a dainty box decorated with gay ribbon.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 2331.

THE WONDERFUL TRAIN THAT IS COMING



Here we have a vivid and realistic picture of what the railway of the future may be like. Remarkable results must follow the invention of the "gyroscope" train, which is the application to the railway of that wonderful little instrument which has proved itself so useful for compasses and aeroplanes. Exhaustive experiments have been made with a large car, and the "gyro-car," that runs on a single rail, has fulfilled all that its inventor claimed for it. Not only can enormous speeds be reached by trains of this kind, but the gyroscopes will keep the train so steady that we shall be able to write while traveling, or even to play billiards.

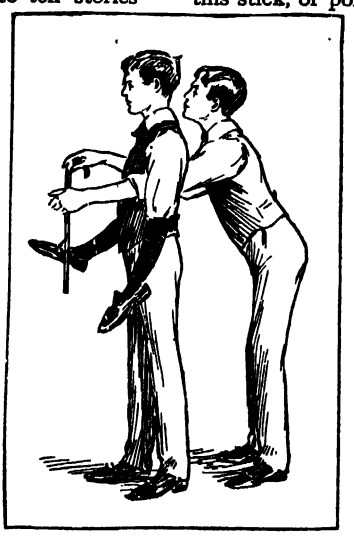


THE LIVING MARIONETTE

CONTINUED FROM 2145

THIS is a variety of entertainment that causes great diversion, and it is not at all difficult to do. Two players—one of them able to sing funny songs, to recite, and to tell stories—may give genuine entertainment to a large company by a living marionette performance. Almost any house contains all the apparatus required for the performance, as a few cast-off garments are all that are necessary in the way of attire.

The name often given to the entertainment is the German Dwarf, but a rather more appropriate name is the Living Marionette. A marionette is a doll, or puppet, that is made to walk, dance, or do acrobatic feats by pulling strings attached to it, and concealed from the audience. The living marionette is not a doll, but is living, and seems to be a little man or boy about two feet high, with an amount of agility that no boy possesses.



1. Making up for the living marionette.

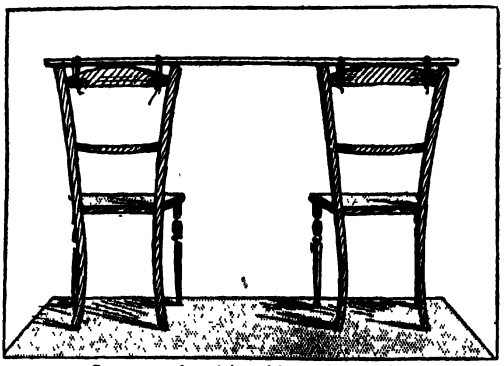
Two boys give the entertainment, and the first thing they must do is to provide a miniature stage. A table will do nicely, but it should have above it a curtain, or some dark cloth. Picture 3 shows how to construct a very good, but a very simple, curtained stage. Here two chairs are placed on the table with a space between them, and a long stick, or pole, is tied to the top rail, going right across both. From this stick, or pole, a curtain is hung so as to represent the surrounding of a little stage, which, as seen by the audience, looks like picture 2. Another good way to make a stage is to arrange a tall clothes-horse with a small board across two of the rails, and then to hang it with a curtain or a cloth. This method is possible only when a clothes-horse with the middle rail of a convenient height is available. This sort of stage without the curtain is shown in picture 4. Yet a third way, perhaps the best of all, is possible only when there are two rooms, one leading into the other. A small table, or box of the height of a table, is placed in the doorway, and curtains, or a dark cloth, hangs from the top of the door. Whatever kind of stage may be used, there should be no lights behind it, as a light might show the audience too much.



2. The living marionette on the stage.

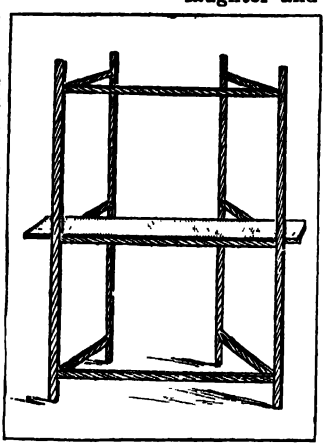
We will suppose that the stage is made, and that the two players are ready to attire themselves for the

performance. One of the boy players, the one who can sing and recite, draws over each hand and up each arm a stocking, and then puts a slipper on each hand. Perhaps, in the dressing up, it would be better to have a stage manager, and a girl makes a very good stage manager. The skill of a girl in the art of make-up is usually greater than that of a boy. Picture 1 shows two boys getting ready for the performance.



3. Stage made with table and two chairs.

The second boy takes a handkerchief, or a pair of gloves, or a short cane in his hand, and puts his arms around the body of the first boy just under his armpits, as seen in picture 1. Now the stage manager, or manageress, drapes the two boys with a large cloak, or other article of attire, taking care to show the face of one boy only, and leaving visible the hands of the second boy and also the hands of the first boy with the slippers and stockings on. The marionette is ready to give his performance. He takes his stand on the stage, as seen in picture 2, which is a view of the stage from the front, where the audience will be sitting. When everything is in place the stage manager lifts or draws aside the curtain, and makes a little introductory speech:



4. Stage made with clothes-horse.

"Ladies and gentlemen, you see before you the only genuine Circassian dwarf who has ever been taught English. His name is Pimpleskivitch, and, although you will not believe it, he is three hundred and sixty-five years old. He has just escaped from Russia, as he thinks he has lived long enough in one country. He arrived the day before yesterday, and has since then learned English perfectly. He will now give you his performance. Pimpleskivitch, begin!"

The stage manager retires, and the dwarf begins. As he sings, or recites, or tells stories, he slaps the stage with his feet (really his slippered hands), and his hands (really the hands of the boy who is concealed from view) move about, wipe his face with the handkerchief, or twirl the cane. The effect is very amusing if the performer who is seen is able to keep up a running fire of entertainment. The boy behind must keep his body perfectly still, moving nothing but his hands. His is the most unpleasant part, because he cannot see what is going on, although he can hear the laughter and applause. The effect is heightened if the dwarf, or marionette, is provided with a false face, false nose, or false beard, or, if these be not available, he may have his face rubbed with a burnt cork, in which case he can appear as a genuine Congo dwarf.

A photograph of two boys giving their entertainment of a living marionette is drawn in picture 5. In this case they are made up to represent a dwarf woman. Picture 2, as may be seen, shows a clown, and this make-up can easily be made by the help of a piece of calico and a few pins. A good deal depends upon the make-up, as a really funny make-up strikes the audience right away, and makes the songs and jokes and dances seem much funnier than they would with a poor make-up. Especially if the performer is rather deficient in humor, he should have a particularly good make-up. With a wider stage two pairs of performers may exhibit at the same time. This increases the probability of success of the entertainment, as it gives the opportunity for dialogue. When there are two pairs of performers it is best that one pair should represent a dwarf woman and the other a dwarf man. Even although this entertainment is very simple, it should be practised once or twice in private before the first public performance is given. Also the songs or jokes should be carefully committed to memory, that no hitch may occur in the performance.



5. Photograph of a living marionette.

A CHRISTMAS-TREE FOR THE BIRDS

CHRISTMAS would not be Christmas without a Christmas-tree. But have you ever thought, when you have been enjoying yourself, that the winter, which brings lots of fun for all of us, is a very uncomfortable time for the poor things who have not any warm homes?

Perhaps, on some cold morning, you have looked out of your window, and have watched the birds flying about among the bare branches of the trees in the garden, searching the ground in the hope that some kind person has thrown out a few crumbs for them?

Have you not sometimes wished there was a Santa Claus to bring a tree full of good things for the birds? Perhaps it never occurred to you that *you* might be the birds' Santa Claus? Well, we are going to see how to make a Christmas-tree for those poor little mites.

First, we must get a small fir-tree that can be put into a pot. Probably we shall find one in the garden, and will be allowed to dig it up. If not, we can buy one about Christmas-time for a quarter.

When we have got our tree planted in a large flower-pot, we must get some small baskets—the tiny ones that candy is sold in will do splendidly—and tie these baskets to the branches of the tree. We can put all sorts of things into these baskets—bread-crumbs, nuts, little pieces of crust or toast from the breakfast table, or some of the seeds that are given to tame birds.

Then we must hang up tiny pieces of cocoa-nut. These are for the tomtits, and there is nothing that they like so well. Other birds are very fond of little pieces of suet.

We can make our Christmas-tree look very pretty with some bright pieces of cloth and ribbon, or colored paper made into little bags to hold bread-crumbs, and then, when it is quite finished, we must put it out in the garden or on the window-ledge of our own room. At first the birds will not understand, because nobody has ever taken the trouble to make a Christmas-tree for them before, and perhaps they will think it is some sort of trap. But presently some of the bravest ones will come. Then we shall see them perch on the branches, and look round in every direction to see if there is any danger.

We can watch them through the window, and they will not be frightened if we do not move. As long as we keep quite still, they will not think we are going to hurt them. In a little time the birds will put their little heads in the baskets, and give a little twitter of delight when they find the good things there. Other birds will be watching them from the trees, and, when these see that the braver ones have not been hurt, they will come too. When the tree has been out a little while, we shall see perhaps forty or fifty birds of all sorts fluttering round it.

When they have eaten everything, we can refill the baskets. Then next morning we should put the tree out again, and we shall be surprized to find that all the birds will be waiting. They will have told all their friends, too, and those who came the first day will have been spreading the news of the wonderful tree for miles round.

If you watch them carefully, you will find that you can recognize many of them, because there is just as much difference between birds as there is between people, if only you look at them closely. And they have all sorts of different characters, too. Some are quarrelsome and some are timid. Some try to push the other birds away when they have found a little basket full of good things, and others are generous little fellows who call the others to help them enjoy anything very good.

If we put our Christmas-tree out every day for a week, we shall find that by degrees the birds grow more and more tame, till at last we can stand quite close to the tree and watch them. If we are careful (the great secret is never to move quickly) the robins, which are the boldest of all our birds, will learn in time to take bread-crumbs from our hand, but we must not be surprized if they will not do this at first, because we must remember that we seem great giants to them, and some people are so cruel that we must give them time to learn to trust us and treat us as their friends.



A CHRISTMAS-TREE FOR THE BIRDS

A CHRISTMAS GYMKHANA

"A GYMKHANA," Meg explained very carefully, "is a party at which everybody plays new kinds of games—funny games that make you laugh, and exciting games, with prizes for those who win."

When all the children had arrived, they found that the drawing-room had been almost cleared as if a dance were to take place; but down the centre of the room they saw two rows of bottles standing upright, with little Christmas-tree flags stuck into the corks. There were eight bottles in each row.

The children could not think what they were for until Meg explained. She said that the first game was to be a DRIVING MATCH. Two girls were to be blindfolded and harnessed together with ribbons, and a boy would drive them up and down the room and would steer them first to the right and then to the left between the bottles, so that none of them upset.

Two boys and four girls would begin together, and the team that got back to the starting-place first would win.

Everything was arranged in a minute or two, and the girls, with handkerchiefs over their eyes and the harness of bright-colored ribbons tied to their arms, stood ready to run the moment the word was given.

The boys who were to drive them were told that they must not speak to the girls, but must steer them between the bottles by pulling on the reins.

Everyone was quite silent while Meg clapped her hands and then called out, "One—two—three. Go!"

The girls dashed off in a moment, and the boys had to hold them back with the reins to keep them from going too fast. Of course, the boys could see where they were going, but the girls could not, and sometimes they all got so excited that, when the driver tugged at the reins one way, they all went off in another direction. One team turned right round and went in the wrong way altogether, and before they could be got right again they had upset two of the bottles.

One team got to the end of the row of bottles without upsetting a single one, and then turned round to come back. But they turned the wrong way, and ran right into the others and all got mixed up.

At last they got the reins untangled, and then there was a fine race down the room. The two teams were so close at the finish that everyone thought they would get back together, but at the last moment one of the girls just touched one of the bottles with her dress and knocked it over. This stopped them for a second, and so the other team won.

After this first driving race everybody wanted to try, and Meg said that the teams that won must stand on one side of the room and those that lost on the other. Afterwards, those that won would try again, and go on trying until they were beaten.

Of course, after about half an hour there were only two teams left, and then came the most exciting race of all, because the one that won this time would have the prize.

When all the driving races were over, Meg said they would have an "EGG AND FAN RACE."

Two egg-shells were brought in. They were quite hollow, for the inside parts had been blown out through little holes made at each end with a pin.

These two eggs were placed on the floor, and two boys were told that they must crawl along and blow them to the other end of the room, where two girls would be waiting with fans. The girls would have to fan the eggs back to the starting-point, and, of course, the one that got back first would win. This was even better fun than the driving race, because the boys looked so funny crawling along on their knees and trying to blow the eggs so as to make them go straight. It was much more difficult than it looked, because the eggs were not round, and therefore they would roll off in every way but the right one.

The girls found that it was even worse to fan the eggs along than to blow them, for, instead of going straight, they would go first on one side of the room and then on the other. One girl got so angry with her egg that she gave it a bang with her fan and broke it.

The children who were watching laughed so much that they thought they could not laugh any more; but Meg presently suggested a BASKET RACE, which was still more exciting.

Two big clothes-baskets were brought in, and to each one there was tied a rope long enough to reach from one end of the room to the other. The baskets were placed at one end and the ropes stretched to the other.

Then two boys and two girls had to stand together, and when Meg called out "Go!" the girls ran down the room as hard as they could and jumped into the baskets. The boys had to pull them back with the ropes.

This was great fun. The boys tugged and tugged, and first one basket with a girl in it would be in front, and then the other. All the children shouted, and said that this was the best sort of race yet. The girls were so anxious to try that they could hardly wait for their turns. It was so fascinating to be pulled along like that, especially when the baskets were so close together that no one could tell which would win.

When all the races were over, Meg said they would finish up the evening with a dance—but not an ordinary sort of dance. It was to be what she called a COTILLON.

Instead of the boys asking the girls to dance, the girls chose their partners, but had to do this in all sorts of funny ways.

Meg brought in a big doll made of pillows, dressed up in one of her own dresses.

She put two chairs in the middle of the room, and then made the pillow-doll sit on one chair and one of the girls on the other. Then two boys came, and the girl had to give the doll to the boy she did not want to dance with, and then she waltzed round the room with the other boy.

This looked very funny, because one boy always had to dance with the doll, and it looked perfectly absurd.

A CHRISTMAS CHARADE

HERE is a pretty little charade that can be entirely acted by children. It would make a charming entertainment for Christmas Eve, and would not only interest young people, but would be amusing to everybody in the audience. The word that is to be guessed is, of course, hidden in the scenes of the little play.

The charade can be acted in a drawing-room without much preparation. All you will have to do is to move the necessary furniture to one end of the room, and then place a lot of chairs at the other end for the audience.

If possible, try to arrange things so that the part of the room that will be your stage is close to the door. Then the actors will be able to make their entrances and exits nicely. If this cannot be done, a screen should be put up, and the performers must remain behind this when they are not acting.

FIRST SCENE

A room. At a table Princess Myra is sitting knitting. As she knits she sings:

A Princess sat in a castle grim,
And weary at heart was she,
And her eyes were dim as she thought of him—
A soldier brave
Far across the wave,
A soldier of low degree.

She stops singing and rises from her chair. For a moment she stands listening. Then the door opens, and a young man rushes in and kneels before her.

PRINCESS: Why are you here? You must go! You must go!

BRIAN: I have come so far to see you, Princess. Do not send me away.

PRINCESS: You are in danger here. If my father found you he would have you imprisoned.

BRIAN: Princess, I love you! I have traveled a thousand miles to see you. I cannot go.

PRINCESS: You must! You are in danger!

BRIAN: I am a soldier!

PRINCESS: For my sake you must go.

She places her hands on his shoulders and looks into his face.

BRIAN: You do not love me then?

The Princess turns away and takes up her knitting. She hides her face. For a moment he watches her; then he leans over her shoulder to see at what she has been working.

BRIAN: What are you making, Princess?

PRINCESS: It is but a little thing—a knitted mat of silken threads, such as we ladies make to pass the days. It was for you—see, it is nearly finished.

BRIAN: It is of red silk. Red is for love!

PRINCESS: And 'tis a soldier's color.

He kisses her. She starts as she hears somebody coming.

PRINCESS: Go! You must go! To-night I will send a letter to you. But now you must leave me.

He kisses her once more and then leaves the room. She leans over the table and covers her face.

SECOND SCENE

Brian is sitting by a bare table, on which is a lighted candle. He is reading a letter. His sword lies in front of him.

BRIAN (*reading aloud*): "I love you, Brian. But if my father knew he would send me far away, and I dare not think of what would happen. Brian, I am a Princess; they say I must marry a Prince, who some day will be a King, like my father. I have given my heart to you, but you must be worthy of it. Go! take your sword and win fame. Come back when you have won a soldier's honor, and then, maybe, my father will ennoble you, and some day consent to our marriage."

For a few moments he sits twisting the letter in his hands. Then he kisses it, and puts it into his pocket.

BRIAN: I must win a soldier's honors. Ah, well, I can but try! It is her wish; and if I lose my life, it is well lost. I must try! I must try!

Taking up his sword he leaves the room.

THIRD SCENE

A room. The Queen, Princess Myra's mother, is standing. Princess Myra is kneeling on the floor before her.

QUEEN: My daughter, for three long years you have shut yourself in this small room. Your eyes have grown red with weeping. Many princely suitors have asked your Royal father for your hand, but to all you have refused to listen. This must not be, my child. The time has come when you must marry one of proper rank.

PRINCESS: Mother, I cannot! I have vowed to marry no one unless he be of my own choice.

QUEEN: This is madness! The Prince we have chosen for you is young, handsome, and brave, a soldier who has risen to save our country and our throne. For his deeds your father has raised him to Royal rank.

PRINCESS: But, mother, I cannot marry one I do not love.

QUEEN: None could help loving so brave a soldier. And his wealth is equal to his bravery.

PRINCESS: I care not for his money. I will not see him.

QUEEN: You shall see him, for he comes now.

Brian enters. He stands watching them for a moment. The Princess is still kneeling before her mother. Suddenly she looks up and sees him.

PRINCESS: Brian! You have come back at last.

She jumps up, runs to him, and throws her arms round him.

BRIAN: At last! Say I am not too late, Princess; say I have not come too late.

PRINCESS: I would have waited for my soldier all my life. I care not if you are poor. I will marry you, and no Prince!

QUEEN: But, child, this is the Prince!

BRIAN: Yes, Princess, I am the Prince of whom the Queen spoke. You sent me away to win fame and fortune with my sword. I have won a soldier's honors, and a fortune that——

PRINCESS: I did not send you away because you were poor, Brian.

BRIAN: 'Twas your father who made me rich that I might have sufficient for our state. Honor and wealth are ours, Princess, and now——

She kisses him, and speaks very softly.

PRINCESS: My Prince!

The hidden syllable in the first scene is *mat*; in the second, *try*; in the third, *money*.

The complete word that the audience have to guess is, therefore, *matrimony*.

The Princess should wear a long white dress reaching to her feet. Her hair should be bound with golden bands made out of gilt braid, and round her waist she should wear a golden girdle made of the same braid. The soldier's uniform can be made out of a pair of blue serge trousers and an Eton jacket. A strip of the gold braid must be sewn down each leg of the trousers, and the Eton jacket must be worn with the lapels turned over and pinned across the chest. It should be covered with the material which is called "Turkey Red," and some gold braid should be sewn on the front. A helmet with brass chin-strap can be bought at a toy-shop for a quarter. The sword and belt could be made with wood and silver paper, but the toy-shop ones sold for a quarter look neater.

The Queen should have a dark dress of velvet. From her shoulders should hang a long train of some dark crimson cloth, and cotton-wool should be sewn round the edge to look like ermine. A crown can be made out of cardboard covered with gilt paper.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF DECEMBER

WE shall find that much sharper frosts are to be expected after Christmas and the New Year than before. Even our pot-plants on our window-sills may suffer from frosts at night. A great protection is to be found in newspaper. If we fold one and line the lower part of the window with it we keep out a good deal of cold, and we may quite lightly spread another over the plants themselves. This is the method often employed in cottage homes, and, so long as it is effective, it matters not that it is a homely and rough-and-ready way. It is far better than letting the plants suffer.

But suppose our pot-plants have become bitten by the frost, and we take them into our hands, only to see limp, almost lifeless specimens. What are we to do? First of all we must see to it that not a ray of sunshine touches these frost-bitten plants. We then water them with cold water from the rose of a can all over the foliage, and after that *put them in the dark* for a day or two. It may be that even these measures will not save the plants, but it is the utmost we can do, and sometimes plants really badly frost-bitten have thus been saved.

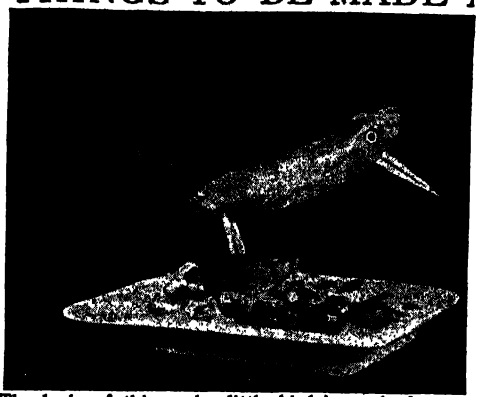
During the winter such plants as geraniums may be allowed to become quite dry before more water is given, and other plants, too, though the soil must never be allowed to become dry as dust in the case of hard-wooded plants like azaleas that already have their flower-buds formed; and, of course, the bulbous plants that we are forcing in pots or growing in shell and fibre must never suffer for lack of moisture. We want to hit the happy medium here—never to keep them sodden with water, nor to let them suffer for want of it. We have to remember that, as we are bringing them forward by growing them in the warmth of our rooms, they are in active growth, and therefore must not receive a check.

We must always remember that, wherever we have plants growing, they are taking up the goodness of the soil, whether in the ground or in pots; not to any great extent at this time of the year, because the majority of plants are making little or no growth—merely, as it were, resting. But with the first breath of spring, life and growth will be stirred into wonderful, silent activity again; new roots will be formed under the soil and new growths above it. If our plants are at that time to make the most of themselves, it is quite likely they will need more food than the soil has to give them, if this should happen to be more or less exhausted. Now, many things make up the plant food-material which we put on the soil to be washed down by the rain or dig into the soil if we get the opportunity. Thus, stable manure, soot, and, on many soils, lime are all very valuable. Then, if we happen to have a heap of leaves that have been decaying for two or three years, we have in this valuable plant soil, and even in burnt refuse, cabbage-stalks, and such stuff; and we may dig that also into the soil—not just at this time, but when growth is restarting, for even burned vegetable matter helps to feed living plants.

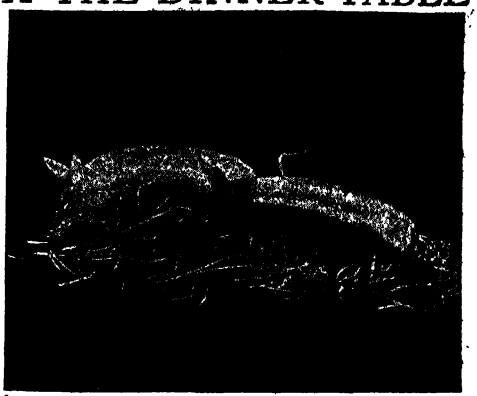
It is more difficult to deal with plants in pots, but these, too, may want a little extra feeding at the time when the flower-buds are forming and until they have begun to open. Very weak soot-water may be given occasionally, and this is especially valuable for helping to make the foliage of a deep, healthy hue. Also, in tins, we may buy various fertilizers and concentrated manures, like bone-meal and others, and should follow out the instructions exactly, in giving to the pot-plants. As a rule, a small quantity is dissolved in a can of water and administered in this way. Just an occasional watering, with this plant-food dissolved in it, does much to make fine, healthy plants. But even pot-plants do not need this encouragement in mid-winter.

And now there is one delightful occupation we may give ourselves even when the world is white with snow, and that is to secure a seed catalogue, and go through it again and again to decide, even in these winter days, what we intend to grow to make our gardens beautiful in the summer that will be coming.

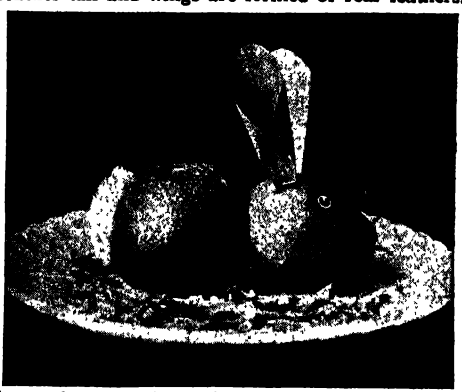
THINGS TO BE MADE AT THE DINNER-TABLE



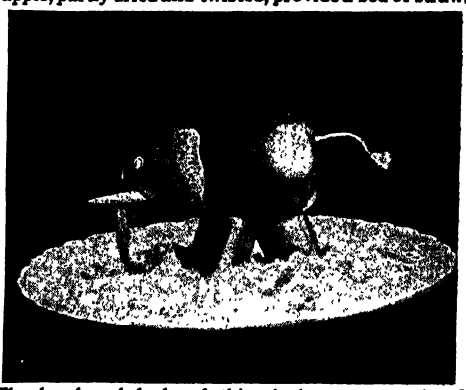
The body of this perky little bird is made from a banana, his beak and two legs from an almond. He stands on a little mound of half an apple, and near by is a nest made of shavings of apple partly dried, wherein lie four eggs, which are white grapes. His feather tail and wings are formed of real feathers.



A couple of piggies may be made from short, slightly curved bananas. To complete them, insert two ears and four legs made from strips of almond, and a curly tail made from a strip of apple partly dried. The eyes and mouth are colored by cochineal. Thin wisps of apple, partly dried and twisted, provide a bed of straw.



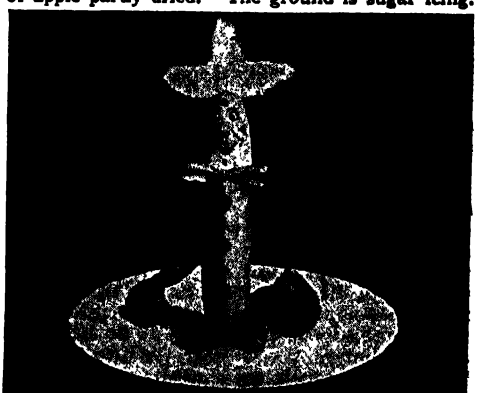
A pear forms the head of this rabbit, while his body is a golden orange. His ears are made of wafer paper slightly browned. His eyes are shown in sugar icing; his whiskers are thin strips of apple, while he reposes on a bed of the same fruit. The only part which is not edible is the small fluffy tail made from cotton-wool.



The head and body of this elephant are made of apples secured together by two pieces of almond. The tusks are of the same nut. The trunk and ears are cut from candied peel, and slipped into slits in the head. The legs are pieces of banana, while the tail is a strip of apple partly dried. The ground is sugar icing.



The head of this little fisherman is made of a cob-nut with the features in sugar icing, while his body is a banana cut in half and twisted. His feet are two almonds. This young man sits and fishes away on a bank formed of two halves of apple, while the rushes are made from thin strips of apple or almond.



This quaint clown is made of a banana, his features marked with cochineal, and a piece of almond for his nose. Three currants are rosettes on his coat, two dates form his shoes. On the left a string of raisins is his sausages, and on the right are two legs of mutton, in the form of figs, stolen by Joey.

THE SILENT MESSAGES OF THE RED MAN

ALL readers of Fenimore Cooper's Red Indian stories know how clever the red men were at following a trail and reading the silent messages which their friends had left for them, and which would pass unnoticed by most of us.

This was, of course, in the last century, before civilization had spread into the Far West, but even now he is very clever at giving and receiving silent messages, and some of the signs which he uses are well worth knowing. They will be particularly useful to Boy Scouts and all who love to spend their spare time in the open country.



STONES, TWIGS, GRASS, & TREE SIGNS

The red man can make use of any common object of the countryside to convey his message. If he wants to tell his friend who follows an hour or a day later which way he has gone, the road is marked by a series of stones every here and there, one being placed on another. Or, if there are no stones, a twig from a bush or tree is stuck in the ground at intervals, or a bunch of grass is knotted as shown in the picture, or a mark made on a tree-trunk. If the friend following is to turn to the right or left, the direction is indicated by a third stone or by the direction in which a twig is laid or the knotted grass is twisted, or a second mark is placed on a tree.

Sometimes a more permanent and substantial sign is fixed up. For example, a stick or small branch of a tree is stuck in the ground slanting-wise, and according as to whether its free end points to the north or south, east or west, so an observer could know which way the traveler had gone. If the one fixing up the sign wished to indicate how far he was going, he would place another smaller stick upright in the ground against the slanting stick. If it was near the fixed end it meant he had not gone far, but if it was near the free end of the slanting branch the traveler had gone a long distance. By placing a number of uprights along the slanting stick, the red man would show how many days' journey he had gone. Two sticks crossed means "this path is not to be followed." A circle drawn on the ground, with a stone or another small circle inside, means, "I have gone home." An arrow drawn in the dust of a road shows the route to follow, and there are large numbers of similar signs which can be used and will be found most interesting.

But not only does the Indian use such methods for the purpose of leaving information behind him. He has a vast code of signs by which he can talk to one of his own or a friendly tribe without speaking an audible word; here are a few examples. Night is indicated by closing the eyes and inclining the head as though it were on a pillow. Day is shown by joining the thumb and forefinger, describing a circle with them, and pointing from east to west. Hunger is shown by sawing across the breast with the hand; scratching the chest means fire; the earth is indicated by pointing to the ground; to speak of a house or tent, the red man places his two hands together to form the shape of a gable roof; when he wants his friend to look at something he points to his eye and then at the distant object. "I understand" is shown by making a circle with the thumb and forefinger, and passing it away from the mouth. Wherever possible an action was indicated by imitating the operation, as in drinking, eating, burying something, and so on. The smoke of fires was formerly much used by the Indians for sending messages to friends a long distance away in a level country like the prairie. The number of fires which were lighted varied, and the rising columns of smoke conveyed the message according to a previously arranged code system. Thus, for example, as shown in the above illustration, one column of smoke would simply indicate the position of the camp, two fires with two rising columns of smoke would be a signal of distress, meaning "I am lost," three columns mean "I have good news to tell," four would indicate a summons to a council of chiefs, and so on. It is not necessary, of course, to copy the actual signs used by the Indians. We can take their idea and elaborate the suggestions which they give, and adapt the signs so that they are suited to the particular country which we happen to be living in.


I am going east — I have not gone far — I have gone far — Gone five days' journey

TELLING A STORY WITH BRANCHES AND TWIGS


The camp is here — I am lost — Good news — Summons to meet

TALKING TO DISTANT FRIENDS BY SMOKE SIGNALS

FILLING A DOLL'S CHRISTMAS HAMPER

WHAT are the things we should like to pack in the Christmas hamper which we learned how to make on page 2137, if only we could get them small enough to go in? It would be delightful to be able to put in a tiny turkey, and a brown ham, also a Christmas cake, a plum-pudding, and last, but not least, some fruit—some beautiful golden oranges from Florida or California, bananas from the West Indies, and some fine Oregon apples.

However, as we cannot get all these delightful things by wishing for them, the next best thing is to try to make them ourselves. But how can we?

There is a delightfully simple way of doing this. From a piece of clay which we can buy from any dealer in artists' materials, we can model our things, and afterwards paint them the exact shades to represent the various articles. If we cannot get this clay we need not despair, for we can make our own modeling material from flour and water, which we must mix into a stiff dough and knead until it is quite firm and clean, and does not stick to our hands. If we use clay, there are just one or two things which we must remember. The more clay is handled and worked the more plastic it becomes. Fresh clay easily breaks, and cannot be modeled so well or worked with the same freedom as well-used clay. Clay that is kept in good condition will not stick to our fingers, and we shall find it a clean and pleasant material to work with.



The things for the hamper

If our clay should become hard and dry, we must break it up into little pieces, sprinkle it slightly with water, and wrap up in a wet cloth until it becomes soft again.

Whenever we have done using our clay and wish to put it away for a time, if we are wise we shall wrap it in a wet cloth squeezed (not wrung) out of cold water.

When we have obtained our clay or dough for the modeling of our articles, an old slate and our box of paints are the only other things required.

We must be careful to make all the things in proportionate sizes: they would not look at all real if we made an orange as big as a turkey! We must take a piece of clay as large as a big walnut for the boiled ham, a piece rather smaller for the turkey, one half the size for our plum-pudding and Christmas cake, and several pieces as large as big peas for the oranges, apples, and bananas.

First we will make the orange, because it is the simplest of them all. Just at this point it will be as well to remember that the things made of clay will dry and harden ready for painting if left for a few hours on the slate, but if made of dough they must be put into a cool oven or before the fire until they become quite hard.

When we try to model the various things, we shall be astonished to find how little we really know about them, so it will be well to have a real orange, apple, or banana to work from. To form an orange we must work the piece of clay between our finger and thumb until it assumes a perfectly round shape, very, very slightly flattened on one side. Prick it all over with the point of a wool needle which has a round or blunt point, to represent the pores found in the skin of an orange. When it is dry paint it with *Chrome Orange*.

To make our apple we proceed in exactly the same way, but we must slightly flatten the ball at top and bottom, and with a pointed match-stalk hollow out a tiny groove round the eye and another at the base, where we insert a tiny twig to represent the stalk.

Touch the eye of the apple with black paint, and paint all the rest of the apple green, using *Olive Green* with a touch of pale *Chrome Yellow*, or, for a red-cheeked apple, give a touch of *Crimson Lake* on one side, gradually merged into the green.

To make the pudding, we take a piece of clay as large as a nutmeg and make it round like a marble. Cut a small square of white muslin and tie it up while it is still soft. Finally, we must give the cloth a few dabs of brown paint to represent stains from the pudding inside it.

Our Christmas cake requires the same amount of clay as the pudding. Roll it into a ball, press out cylinder shape, and flatten one end on the slate. With a pointed match-stalk make the top rough to give it the appearance of a plum-cake. Then paint it a good brown, using *Vandyke Brown* paint and *Chrome Orange* in equal proportions. Afterwards give tiny black dots all over to represent currants.

A fine banana is formed from a little cylinder of clay. Press three pointed edges up along the cylinder, curve it slightly and bring one end to a point. To color the banana, use pale *Chrome Yellow* with little touches of brown here and there, as in a real banana that is quite ripe.

We must shape our ham from a piece of clay the size of a large walnut by first making a ball, which we gradually press on the slate to flatten the under side. At the same time we must nicely curve the upper side with the fingers and draw out the bone at the end. As our ham is supposed to be ready cooked and

glazed for the table, we must paint it a rich brown, using *Brown Madder* paint for the purpose.

An excellent tongue can be formed from a piece of clay about one-third of the size of the ham. It should be shaped as shown in the picture on page 2269, and colored the same shade as the ham.

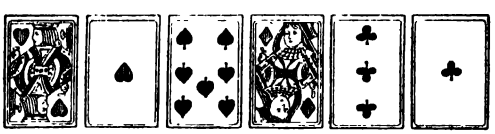
Last comes the turkey, made from a piece of clay about the size of a small walnut, from which, first of all, we model two small legs as in picture 2, and two little flat pieces for the wings. The rest of the clay we roll into the shape of a cylinder; we must flatten one side, and with our fingers draw up the top to represent the breast-bone of the bird. Press the legs and wings into place as in picture 2, and finally we must paint the whole a pale brown, using *Chrome Orange* with a dash of *Vandyke Brown* paint. Last, but not by any means the least, we wrap up daintily each article in a square of white tissue-paper or cotton-wool, remembering that the common things of life may always be made more beautiful with the exercise of a little care and taste in their arrangement.

If we pack our hamper properly, the things will travel safely to their destination. We must place our ham at the bottom, as it is by far the heaviest article; after that the turkey and tongue side by side, putting little pads of cotton-wool in the hollow places, so that the legs of the turkey do not get broken. Above these come the pudding and the cake, and last of all we put in the fruit, of which we must make sufficient to fill up all the empty space, and our little Christmas hamper is then quite complete and ready to be posted.

The little friend who receives the hamper will be able to dish up the various articles on the tiny dishes of a doll's tea or dinner service, and have delightful times playing at dolls' parties, shops, and restaurants.

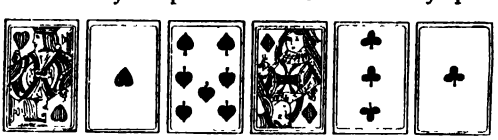
THOUGHT-READING BY CARDS

THIS is a trick that needs the assistance of an accomplice. Some cards—six, or nine, or twelve, or as many as you like—are spread out, face upwards, on a table.



1. A row of cards before touching

The thought-reader goes out of the room, and the accomplice, or stage manager, as we shall call him, says: "Will anyone please pick up a card, any card, and hand it to me?"

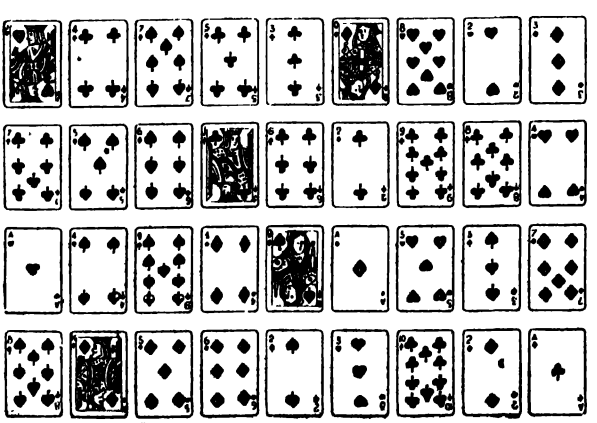


2. The same row of cards after being touched

Someone does so, and the stage manager puts it down again in the same place. The thought-reader comes into the room, and by merely looking at the cards he knows which card has been lifted and replaced. But he need not say so right away. He can go up to any one of the company, and after saying "Think of the name of the card that has been touched," he holds his or her hands or head and then says what card it was.

How does he know? Easily enough. The cards must be of the kind that have a line round each, outside the spots or picture. Many cards are of this variety. They are always cut so as to leave a wider margin at one end than at the other. As the cards are spread out on the table in the first instance, all the broad margins are put facing one way. When the accomplice replaces the card, he puts it back with the narrow margin at the end where the broad margin was before, and the conjurer sees by merely looking at them which card has been taken and put back. Picture 1 shows a number of cards as they would be before being touched, and picture 2 shows the same cards after the conjurer comes into the room. It is plain that the three of clubs is the selected card. This trick is impressive because the accomplice says not a word and makes not a sign. Indeed, he may be sent out of the room or behind a screen before the conjurer comes into the room.

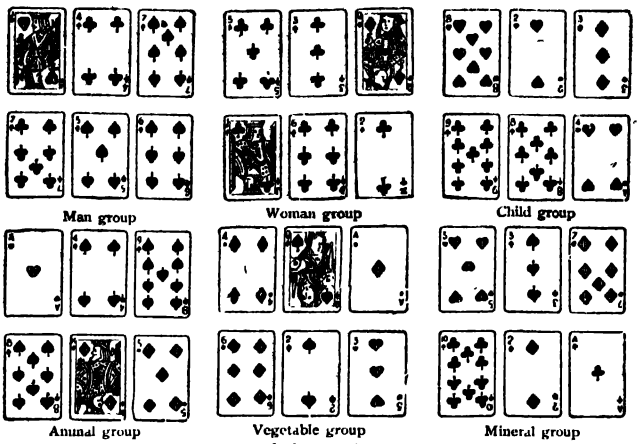
Another thought-reading card trick is very clever and very puzzling. Thirty-six cards are used, and again there is both a conjurer and an accomplice. The cards are spread out in four rows, with nine cards in each row, as seen in picture 3. The conjurer goes out of the room and someone touches a card. Then when he comes back the accomplice says something like this: "Uncle



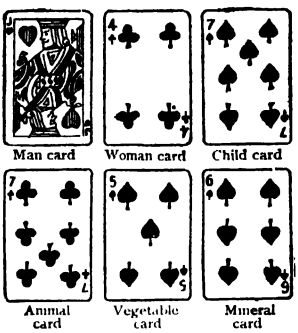
3. Thought-reading with thirty-six cards

William likes green peas," or "Little Mary Smith lost her needle." These words indicate what card has been touched. This is a trick that may be repeated as often as you like; the more often it is done the more puzzling it becomes, and it is practically impossible to find the key for it.

What is the key or secret code used by the performers? They must suppose that the cards are divided into six groups of six cards in each group as indicated in picture 4. Then the names of the groups take the following order—man, woman, child, animal, vegetable, mineral. Picture 4 indicates the order of the groups. Then it is supposed that each group is divided in the same way, so that in each group there is a man card, a woman card, a child card, an animal card, a vegetable card, and a mineral card. Picture 5 indicates the name of the cards in each group. The sentence spoken by the accomplice must contain two nouns, the first noun indicating the group and the second noun indicating the card in the group. Thus "Uncle William likes green peas" means man group, vegetable card, so that the card touched will be the second from the left hand in the second row from the back. "Little Mary Smith lost her needle" means child group and mineral card, so that in this case the card touched was the card at the extreme right of the second row from the back. "Our donkey loves baby" means animal group and child card, so that the card this time is the one third from the left of the second row from the front. Very little practice will give skill in this trick, which is one of the best for evening parties, as people ask for it to be repeated again and again, hoping that they may at last be so clever as to find out the secret.



4. Division of the cards into groups



5. Division of a group

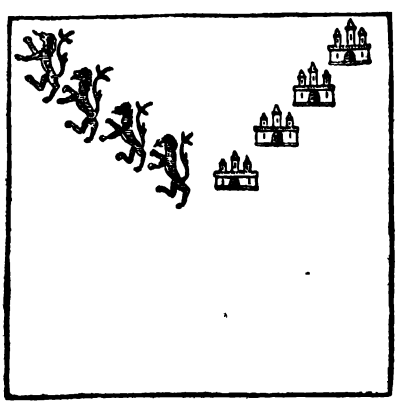
HOW THE MILLER ARRANGED THE SACKS

ON page 2145 is the problem of the miller and the sacks. This is the answer to it.

The way to arrange the sacks is as follows: 2, 78, 156, 39, 4. Here each pair when multiplied by its single neighbor makes the number in the middle, and only five of the sacks need be moved. There are only three other ways in which the sacks could have been rearranged; but any one of these would have demanded that more than five sacks should be moved.

THE PUZZLE OF THE WEAVER & THE CLOTH

A WEAVER had a piece of cloth which was embroidered in a very peculiar fashion with four lions and four castles, as shown in the picture. The four castles run from near the centre to the top right-hand corner, and the four lions run from near the centre to the top left-hand corner.

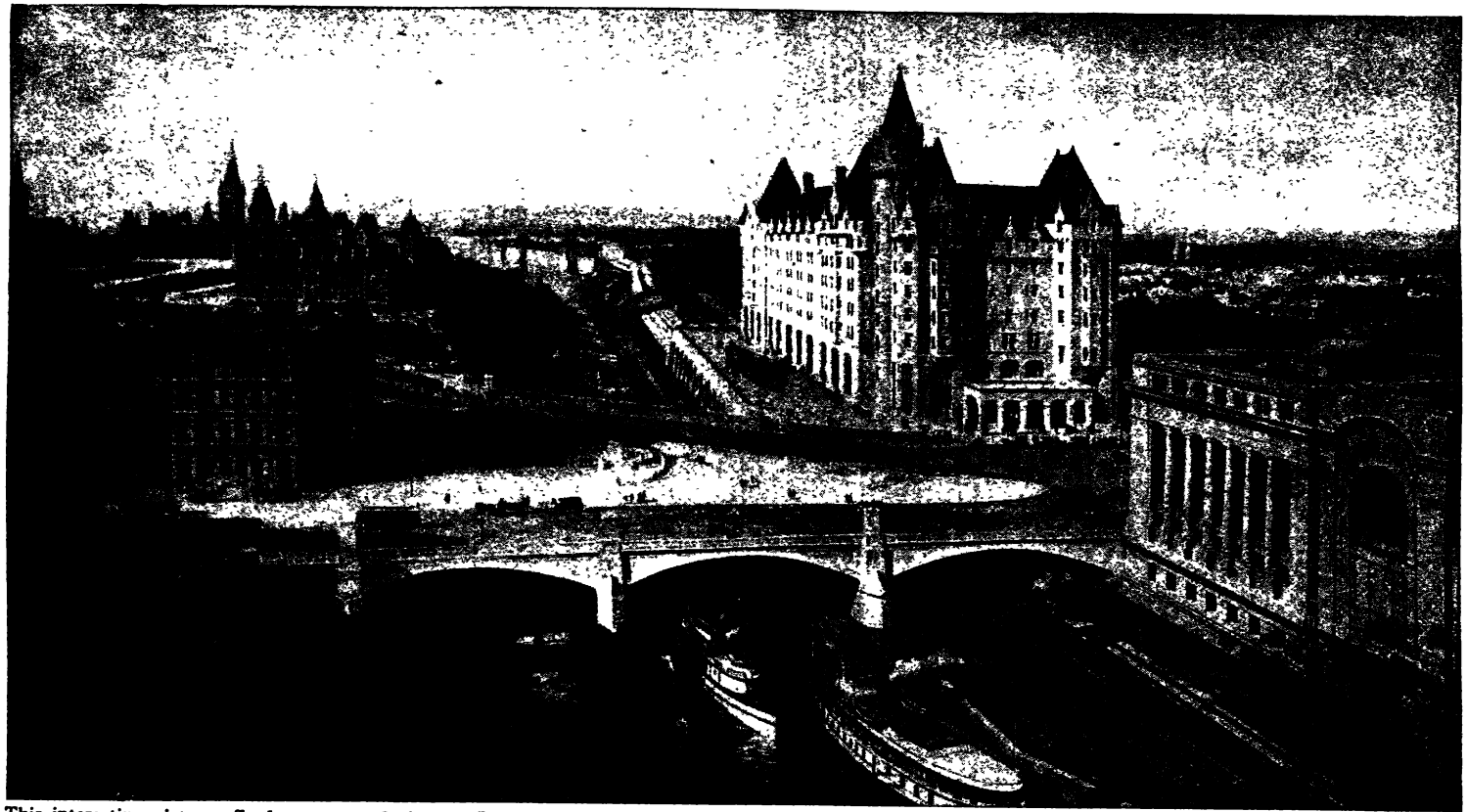


The task the weaver set his friends to do was to show how the cloth could be cut into four pieces, each piece being equal in size and shape, and each piece having a castle and a lion upon it. This seems a very difficult, perhaps an impossible, thing to do; but Mr. Henry E. Dudeney, in his "Canterbury Puzzles," shows how it may be done.

Remember that each piece must be equal in both size and shape, and each piece must have upon it both a lion and a castle, so that the four pieces are exactly alike. The solution of this problem requires patience and thought, but it is well worth the time and labor expended on it, and we shall feel quite proud of ourselves when we have found out the right way to cut the cloth.

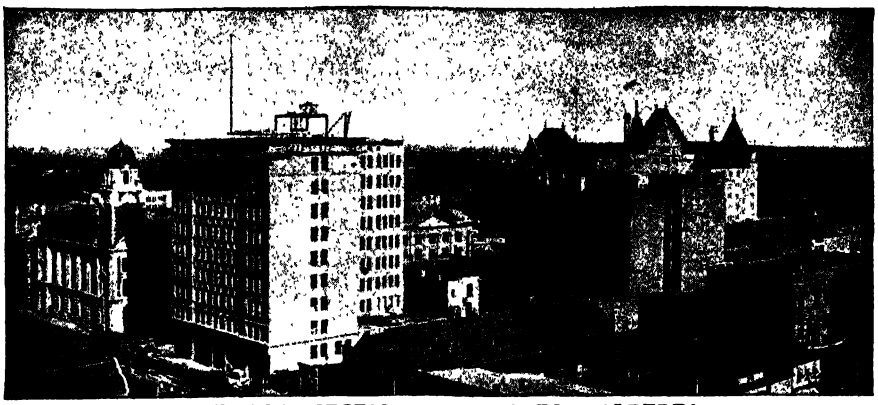
THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 2355.

SOME IMPOSING BUILDINGS IN OTTAWA



This interesting picture affords an unusual view of Ottawa. In the background to the left, beyond the Post Office are the Parliament Buildings. That part of the double bridge across the Rideau Canal, leading to the Parliament Buildings, is Dufferin Bridge, and the other part is Sappers Bridge. The Royal Alexandra Bridge across the Ottawa River may be seen in the distance, while nearer are the locks by which the Rideau Canal descends to the river. The magnificent Chateau Laurier Hotel, owned by the Grand Trunk Railway, is on the right, while a part of the new Grand Trunk Central Station is also shown. The Parliament Buildings were burned in 1916, but are being rebuilt.

Picture by courtesy of the Grand Trunk Railway.



A BUSINESS SECTION IN EDMONTON, ALBERTA

RAILWAYS AND CANALS IN CANADA

CONTINUED FROM 1920

ENGLAND was the first country in the world to build railways. Although many people did not like them at first, because they were so different from the stage-coaches which they had known so long, yet in time even these people began to see that persons and goods could be carried much more quickly and cheaply by the iron horse than by the horse of flesh and blood. Canadians very much wanted to have railways of their own, especially when they saw their American friends following the example of the English. They felt that it would not do to have all the railways in this continent on the American side of the border, and they also felt that the people in the United States would take their trade from them if something were not done.

At that time most Canadians lived near the St. Lawrence River, the Great Lakes, or the Atlantic Ocean, but in winter the great rivers and the lakes were frozen so that boats could not sail over them. It is true that the ocean did not freeze, but it was hard for people and goods to reach it when there were no trains to carry them. The people living in Canada were so few and scattered that they hardly knew how to get the money which was needed to build the railways, nor were they sure the railways would be a success even if built.

However, the Government agreed to help, and several short bits of railway were built in Quebec and Ontario, and later in Nova Scotia and New Brunswick. These early lines were quite different from those we now know so well. The rails were made of wood, with strips of iron fastened on top, and the rails themselves rested on blocks of stone. The cars were small and uncomfortable, and the locomotives were much smaller than those we now have.

THE BUILDING OF THE GRAND TRUNK RAILWAY

In 1852, a company was formed to build a long line of railway, and to take over most of the short lines which were then being worked. This company was called the Grand Trunk Railway Company, and most of the money which was needed was raised by Englishmen. It was intended that the railway should run from Windsor (in Ontario) to Toronto, Montreal, Portland (in Maine), Levis (opposite Quebec), and perhaps to the Maritime Provinces. Most of it was finished in a few years, but it did not go farther east than to Riviere du Loup. It crossed the St. Lawrence River at Montreal, where a very long bridge, called the Victoria Bridge, had to be built.

Copyright, 1913, 1918, by M. Perry Mills.

The Canadian Government gave a good deal of money to the company, but even with this help English people were very much disappointed when the railway failed to earn enough to pay them for their trouble.

There was still another reason in which you will perhaps be more interested. The rails on the Grand Trunk Railway were farther apart than they were on most of the American lines. In the United States the distance between the rails was generally 4 feet 8½ inches, but the distance between the rails of the Grand Trunk was 5½ feet. This had been done on purpose, so that in time of war the Americans could not run their trains over the Canadian railway, and so could not bring soldiers into the country. But in time of peace it made it very hard for goods and people to pass between Canada and the United States, and the Grand Trunk lost a good deal of business.

After several attempts were made to meet the trouble, it was decided to make the distance between the rails of the Grand Trunk the same as between the rails of the American railways. This was done in a few days, and then trains could easily pass from one country to another. Still later, the Grand Trunk started to build lines over a large part of Ontario, and also to Chicago and other American cities.

THE GRAND TRUNK PACIFIC RAILWAY

So many people have been going to the Canadian West that in 1903 the Government decided that another railway must be built. They made a bargain with the Grand Trunk Railway to construct a line from Winnipeg to Prince Rupert on the Pacific Ocean. This new railway is called the Grand Trunk Pacific, and crosses the Rocky Mountains through the Yellowhead Pass, and then turns in a northward direction so as to reach Edmonton. At Edmonton it turns southward again until it reaches Winnipeg, where it connects with the National Transcontinental Railway.

THE NATIONAL TRANSCONTINENTAL RAILWAY

This railway runs from Winnipeg east to Moncton in New Brunswick. Its trains were carried over the St. Lawrence on huge ferry-boats. The tracks on each side of the river ran on to the dock, and when the boat was in place it looked as if a bridge had floated up to receive the train. The great bridge which was being built over the river at a point a little above the city of Quebec crashed into the water some years ago, and many people were killed. A new and much stronger bridge was immediately commenced, and was finished in 1917.

The Transcontinental Railway connects at Moncton with the Intercolonial Railway. The Canadian Pacific also connects with the Intercolonial and both these great roads are able to transport their passengers across the continent from the Atlantic to the Pacific Ocean.

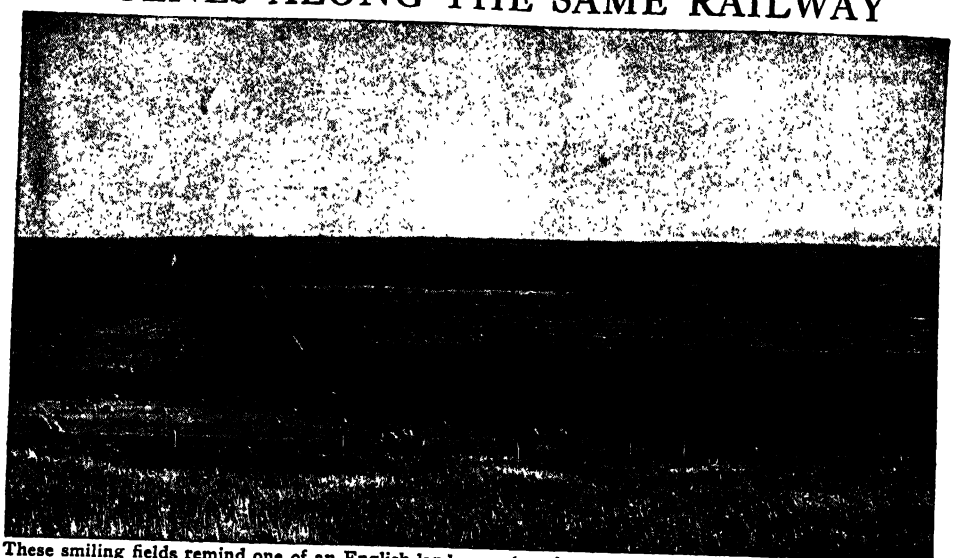
THE INTERCOLONIAL RAILWAY

Even before the Grand Trunk Railway was started, many Canadians thought that a railway should be built from some place in the Province of Quebec to the Atlantic Ocean. The shortest route through British territory seemed to be between the city of Quebec and St. Andrews in New Brunswick. At that time most Canadians thought that the land through which this railway would pass belonged to New Brunswick and Quebec. But the Americans said that most of it belonged to the state of Maine, and when the difficulty was settled, it was found that the proposed railway would pass over American territory. As a result, the plan was dropped.

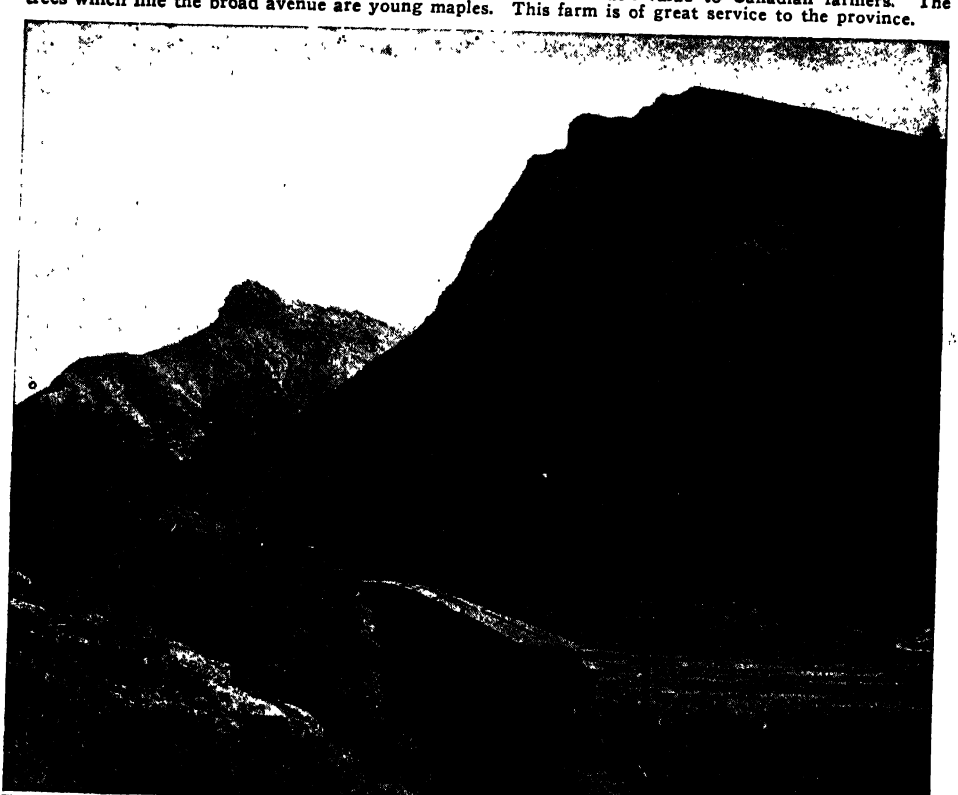
During the American Civil War, Great Britain and the United States nearly came to blows because the Americans took two Confederates by force from a British ship. British troops were even ordered to go to Halifax, but every one saw that without a railway it would be very hard to get them to Quebec and Ontario, where they would probably be most needed. Fortunately, the quarrel was settled without a war, but it showed the English and Canadians that a railway must be built from the Maritime Provinces to Quebec.

The British refused to help unless it was built a good distance from the border of Maine, so that in case of war it could not be seized, but the people of New Brunswick wanted it to run through the valley of the St. John River, which would bring it very near the border. For a time the plan was dropped, and Nova Scotia and New Brunswick started to build short lines of their own.

SCENES ALONG THE SAME RAILWAY



These smiling fields remind one of an English landscape, but they were raw, unturned prairies not many years ago. They are a part of the great experimental farm near Brandon, Manitoba, where different varieties of grains, fruits, vegetables and the like are tested to determine which are best adapted to Canadian conditions. The results of the tests have been of much value to Canadian farmers. The trees which line the broad avenue are young maples. This farm is of great service to the province.



The scenery in the Canadian Rockies is hardly surpassed for beauty or grandeur anywhere in the world. This is The Gap, the entrance to the Rockies, where there is barely room for the train and the river to run side by side. Marvelous engineering skill has been shown in building the road through the mountains, which seem to bar the way completely and to defy the efforts of the engineers. There is little chance for agriculture here. Large numbers of tourists now make the trip through these great mountains every year.

Photographs by courtesy of the Canadian Pacific Railway.

When the Maritime Provinces agreed to join with Quebec and Ontario to form the Dominion of Canada, it was decided that the Intercolonial Railway should be built to connect Quebec with Halifax and St. John. This line was finished, with English help, in 1876. The part between Levis and Riviere du Loup, which had been built by the Grand Trunk, was bought by the Government. The railway followed the route which the English had asked for and which New Brunswick people did not want.

As a result, it is longer than one could wish, but it is far from American territory. It belongs to the Canadian Government, and now includes many more miles than it did in 1876. It runs from Halifax to Montreal, with branches to St. John and Sydney. The Canadian Government also owns all the railways in Prince Edward Island. In this little island province, the rails are only 3½ feet from each other, but they will soon be placed at the regulation distance.

THE CANADIAN PACIFIC RAILWAY

When the Dominion of Canada was formed in 1867, the country between Manitoba and British Columbia was uninhabited save by bands of Indians and a few white people, engaged, for the most part, in fur trading. Even Manitoba, which became a province of the Dominion in 1870, had very few inhabitants. The people of British Columbia said that they would join the Dominion if a railway were built to connect them with eastern Canada. The Dominion Government agreed, and promised that the line should be begun within two years and finished within ten. On these conditions British Columbia became a province of Canada in 1871.

The Dominion Government made a bargain with two companies to construct the railway. One of them was charged with paying money to the Government to help in the elections. The Government resigned, and in the election following was beaten, as most people believed that the charge was true. The next Government started to build the line, but failed. Then the old Government was re-elected in 1878, but it, too, failed in the attempt. Finally, in 1881, it made an agreement with the Canadian Pacific Railway Company to do the work. This company completed the task in about four years.

The railway passes through the Kicking Horse Pass in the Rocky Mountains, and it also has an important branch which runs through the Crow's Nest Pass. Since 1885, a good many miles of line have been bought or built in Ontario, Quebec, New Brunswick and Nova Scotia, and also in the West.

The company also has a large fleet of steamers which ply between Great Britain, Europe and Canada, between Canada, Japan and China, on the Great Lakes, except in winter, and along the Atlantic and Pacific coasts. As a result, people may come to Canada from Great Britain, or Europe, in a Canadian Pacific steamer, travel through Canada in a Canadian Pacific train or boat, stay in their hotels, and continue to Japan or China in a Canadian Pacific steamer.

THE CANADIAN NORTHERN RAILWAY

The youngest of the great Canadian railways is the Canadian Northern. It was started in 1899, when a few short lines in Manitoba came under its control. Later on it was extended from Port Arthur on Lake Superior to Edmonton in Alberta, with a great many branches in Manitoba, Alberta and Saskatchewan. Then followed the Canadian Northern Ontario Railway and the Canadian Northern Quebec Railway, both of which are parts of the same system. Finally the company set to work to join these short lines into a transcontinental railway. The work was soon completed and the Canadian Northern now has an unbroken line running from Quebec and Montreal to Vancouver. The Canadian Northern also has two short lines in Nova Scotia.

The western part which runs from Edmonton to Vancouver is called the Canadian Northern Pacific Railway. It crosses the Rocky Mountains through the Yellowhead Pass and runs for some distance, through the pass, in sight of the Grand Trunk Pacific Railway. The Canadian Northern Railway was taken over by the Dominion Government in 1917.

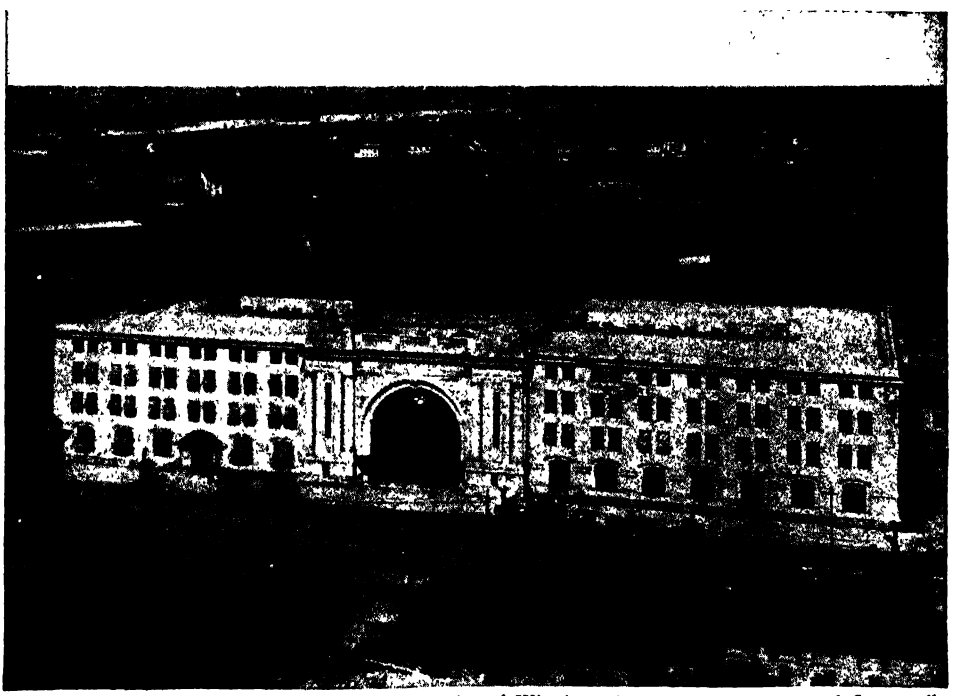
THE HUDSON BAY RAILWAY

One of the numerous branches of the Canadian Northern in Saskatchewan stops at a place called Le Pas, on the Saskatchewan River. In 1911 the Dominion Government commenced to build a railway from this place to Port Nelson

PROSPEROUS CITIES IN THE PRAIRIE PROVINCES



In 1901 Calgary had less than 5,000 inhabitants. In 1911 it was the largest city in Alberta, with a population of 43,655, and continues to grow very rapidly. It is the trading and supply centre for the mining, stock-raising and agricultural interests of the region, is an important station of the Hudson's Bay Company, and contains workshops of the Canadian Pacific Railway.



The Canadian Northern Railway Station, in the city of Winnipeg, is one of the largest and finest railway stations on the American continent. It is built on the site of Fort Garry, the Hudson's Bay Company's old fur trading centre. You can see in the background of the picture, the meeting of the Assiniboine and the Red River.

on Hudson Bay. This line is called the Hudson Bay Railway, and it is hoped that specially built and very strong steamers will be able to ply between Port Nelson and England during three or four months in the summer.

For many years the ships of the Hudson Bay Company have been able to do this, but it is a dangerous voyage even in the summer, on account of floating ice and snow-storms. The farmers in western Canada were very anxious that this railway should be finished as soon as possible. The amount of wheat which they produce has increased so much that the railways find it hard to haul it away to Montreal and other ports before winter begins and the St. Lawrence is frozen.

Most of it, too, is carried from Port Arthur or Fort William to a Georgian Bay port, or to Buffalo, in steamers, as it is much cheaper to do this than to take it all the way in trains. This produces a grand rush to get the wheat out before the lakes freeze, and it is hoped that the Hudson Bay Railway and boats will be able to take part of the crop, and even carry it more cheaply than is possible by any other route.

Light electric railways play an important part in the life of southern Ontario, especially in the part known as the Niagara peninsula.

THE FIRST CANALS IN CANADA

The first canals in Canada were situated a short distance above Montreal, where the Cedar, Cascades and Coteau Rapids are met. They were dug in 1781, and a few years later a plan was drawn up for making canals around all the rapids in the St. Lawrence. This plan was finished after many years' hard work, although in a way it is not yet finished, for the old canals have been deepened several times, and new canals have also been dug.

The St. Lawrence River has also been dredged for a long distance below Montreal, so that there is now a depth of 30 feet of water at the shallowest part. The Dominion Government has now decided to increase this to 35 feet so that larger ships may come to Montreal. This seems necessary because larger and larger steamers are being built, and one which seemed very large a few years ago is not so considered to-day. Above Montreal, many miles of canals have been dug, but most of them only 14 feet deep. Steamers and barges which do not draw more than 14 feet of water may go from Montreal to the head of Lake Superior.

Much larger boats than this, however, can go through the Sault Ste. Marie (commonly called the "Soo") Canal, which connects Lake Superior with Lake Huron. This canal is 20 feet deep, has a lock 900 feet long, and will float a vessel of 10,000 tons burden. The canal on the American side of the St. Mary River is 24 feet deep, and these canals carry every year a larger volume of business than that which goes through the Suez Canal. The Welland Canal, which runs across the Niagara peninsula from the eastern end of Lake Erie to Lake Ontario, is only 14 feet deep, but a new Welland Canal is being built which will be 25 feet deep.

Boats from the Upper Lakes on their way to Montreal may also leave Lake Ontario at Kingston, pass up the Rideau River to Ottawa, and come down the Ottawa River to the St. Lawrence at a point about 20 miles above Montreal. To make this possible several canals had to be dug, and the Rideau had to be dredged part of the way. This canal system is very little used.

A WAY FROM MONTREAL TO NEW YORK

Still another system of canals makes it possible for boats to go from Montreal to New York and back again. The course lies down the St. Lawrence a short distance to the mouth of the Richelieu River; up this river to Lake Champlain, and thence to the Hudson River. The canals in this system are not deep, but a good deal of coal from New York, and hay from Quebec, is carried on barges between the United States and Canada.

There is still another short canal away by itself in the island of Cape Breton. This island was nearly divided by the beautiful Bras d'Or Channel and Lake, and it is now quite divided by these waters and St. Peter's Canal, which connects Bras d'Or Lake with the Atlantic.

The Canadian Government at the present time is building a series of canals in Ontario. These canals will make it possible for boats to pass from Trent on Lake Ontario to Lake Simcoe, and perhaps to Lake Huron. Some of these canals have been finished and are already in use.

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FRANCE IN THE REVOLUTION

CONTINUED FROM 2076



WHEN we visit Paris now one of the first sights we wish to see is really not in Paris at all, but eleven miles south-west from the city. For although Paris is full of splendid buildings, palaces, museums, and churches, there is nothing quite so fine in the beautiful city itself as the magnificent and historic Palace of Versailles.

Let us now imagine ourselves there after the short journey of eleven miles by tram or train from Paris, and make our way first to a room called the Salle de l'Œil de Bœuf, or the Ox-eye Room, from its oval window, the shape of the eye of an ox.

Here, under the rich gildings and fine paintings, the courtiers in silks and laces were kept hanging round in idleness and vanity to see King Louis XV. rise and put on his finery. Close by is the room in which the bad old king lay down to rise no more. The courtiers were near by when he died; and then suddenly there came a sound of scuffling and hurry through the great rooms and across the courtyard as they all rushed to the distant apartment of the king's grandson, now Louis XVI., and his wife, Queen Marie Antoinette. A bystander tells us that the young couple fell on their knees together, and, with streaming tears, exclaimed: "Oh God, guide us, protect us! We are too young to reign!" They were not wise enough to reign in those troublous times. France of that day was like a sturdy youth, who has outgrown his only suit of clothes, and no amount of whipping will keep him in it, no patching will make it cover him.

Many irritating customs had come down from feudal times, and of these the people wanted to be rid. The country was heavily taxed to pay for the expenses of the court, and for wars that were over—wars in which France had lost. But the nobles and the church, who owned a large part of the land, did not pay the largest taxes. Thus a heavy burden fell upon the body of the people, while they had not the right to see that the money was not wasted. Instead of living on their estates, the great nobles spent their lives in Paris. That they might have money to spend on the pleasures of the court, they wrung every last penny that they could out of the unfortunate peasants, and there was much poverty and bitter wrong. Beyond all this, however, the king was an absolute monarch. But the people were no longer willing that his word should be law. They felt

they had the right to govern themselves, and to say how the taxes should be spent. France had outgrown its old government. It would have taken a great heart and a wise and steady head to give her a new one without trouble, and Louis XVI. had neither.

At the beginning of his reign he had wise Ministers, who tried to put the money affairs of the kingdom into order, and to arrange that the burden of the taxes should fall on those most able to pay them. But the queen did not like economy, and the nobles hated interference with their old "rights"—which were the people's "wrongs"; and timid Louis gave up his good intentions. All the time the rumblings of the coming storm, so long threatening, grew ever louder.

How the kings and nobles feasted while the people suffered

There is a story of Nero, one of the worst of the Roman emperors, fiddling while his splendid city of Rome was burning. Turn to Versailles, and you will see Louis spending his days in hunting, or making locks. Some of these, and his tools, are still to be seen in the Palace Museum. And the queen? You will find her in the park, perhaps, dressed up as a shepherdess, driving a flock of white sheep with ribbons round their necks, or playing at being a dairymaid in a little thatched farm. And all the time, as they trifled, as the nobles danced and feasted, their beautiful land of France was perishing from neglect.

We have seen, on page 540, how the French lost Canada, and how their vision of an immense continental empire across the ocean faded away as English colonies strengthened. When the American colonies would no longer bear the yoke of the Mother Country, France sent generous help to them in the struggle. When it was over, the French soldiers went home full of zeal for the truths contained in the Declaration of American Independence, feeling perhaps most deeply of all the words, "All men are born equal."

The national assembly

And so, to the influence of the words of the great writers and thinkers of the day was added that of the returned volunteers, who had seen with their own eyes what it meant to be free and equal and brotherly in a country where there were no nobles, no Royalties.

Then France had to find money to pay for their share of the war which had won independence for the United States. No more could be borrowed or squeezed from the unhappy taxpayers, and at last Louis was obliged to call together the States-General, as they called the Parliament of France. As this was the first time for nearly two hundred years, six generations of Frenchmen had lived and died dumb concerning the government of their country. Great was the excitement during the election of the men who were to form the States-General. There were the representatives of the nobles and clergy, called the First and Second Estates; and the men who represented the great mass of the people—the men who worked either with hands or heads—who were the Third Estate. Lists of grievances were drawn up, also of needed reforms, and even the hopeless roused from their dulness of despair, for something was going to be done at last.

The bursting of the storm

One of the first things that happened was this. The Third Estate determined that its voice should be heard. Hitherto the custom had been for the representatives of the people to sit and talk and vote by themselves, and no one took any notice of their wishes. Now they demanded that they should sit and debate with the other Estates, and have an equal power in voting with them; and they had their way. The three Estates formed the National Assembly, and the chief wish of the people just then was that the king should govern according to certain laws, not by his own will alone; also that all should have a voice in the government.

Louis and his queen and Court were terrified at the power thus seized by the Assembly, for the vain boast of Louis XIV., "I am the State," was now turned by the voice of the people into the declaration, "We are the State," and the timid and foolish king sent away the adviser whom the people most liked and trusted, and summoned German and Swiss troops to Paris and Versailles to keep the people in order.

And now at last the storm burst; it was the beginning of the Revolution. When the crowds in Paris heard the news,

THE SINGING OF THE REVOLUTION SONG



Nothing roused more enthusiasm for the French Revolution than a song written in one night by an officer named Rouget de Lisle, who is here singing the song. It was sung by the men of Marseilles as they marched to Paris, and the people called it "The Marseillaise." It has since been the National Anthem of France.



When the starving crowds of Paris could no longer be restrained, they marched through the rain to Versailles, singing and shouting as they went and compelling all whom they met to join them. The artist has shown in this picture a lady of the nobility seized by the crowd and compelled to sing Revolution songs. The crowd broke into the Palace of Versailles and brought back all the Royal Family to Paris.

and rumors spread that the commander of the Bastille had orders to fire on the people, they became quite wild with excitement, and rushed through the streets, robbing the bakers' shops, the wine shops, the gun shops; shouting "To arms!" and "Down with the Bastille!" Thousands of people attacked the hated prison, till the governor was forced to give in; he was killed in the streets, and the mob never rested till they had pulled down the thick walls that reminded them of the tyranny of kings.

The people now felt their power, and peasants in the country began to attack the castles and monasteries, so as to burn the deeds and papers by virtue of which their lords had so long oppressed them. It is not surprizing that cruel deeds were done in revenge.

The National Guard that had been formed by the citizens to keep order in Paris was commanded by Lafayette, who had fought beside Washington in America, and they chose a cockade of red, white, and blue. The time came when many in danger of their lives were saved by putting on this tricolor badge and shouting: "Vive la Nation!" "Vive la République!" as we should shout "Long Live the Nation!" "Long Live the Republic!"

How the women of Paris fetched bread from the king's palace

The National Assembly at Versailles was talking over plans for reforms, but at last the restless mob in Paris could be no longer held back, and early one October morning thousands of hungry women collected in the market place, crying out for bread. When it was proposed that they should go and demand it of the king at Versailles, they set off to walk in the pouring rain, followed by a great rabble, for eleven weary miles.

Lafayette had the greatest difficulty in keeping any sort of order, and in protecting the king and queen and their children, as the wet and yelling mob burst into the magnificent gilded and painted rooms of the three Louis. They insisted on the king going back to Paris with them. What a procession! Fifty cartloads of the king's grain went first, and pressing before, behind, and round the carriage windows of the Royal Family, thousands of the lowest and roughest sang and yelled and beat drums all the way to the Palace of the Tuileries. "We shall have bread enough now," they shouted, "for we have with us the baker and the baker's wife and boy."

That was the end of the glory of Versailles as a Royal palace; for many years it has been the great national museum of "all the glories of France."

How the king betrayed the people and was found out

The National Assembly worked hard to arrange what they thought would be a better government for France. The old feudal provinces with their oppressive laws and customs were done away with, and eighty-three departments were formed, and divided into districts, which were to be governed by persons elected by the people. The property of the Church was taken for the use of the State, and the clergy were to be paid by the Government. All titles were abolished, and the king no longer could make laws or fix taxes, or decide peace and war.

The king agreed to this constitution, but good government could not be arranged all at once; bread was still dear, and people became suspicious of one another, and violence and disorder spread everywhere. Then the king and queen decided to try to escape from France and seek aid from foreign countries, so that Louis could put down all the new arrangements for reform, and make himself absolute king once more.

What beatings of heart must the Royal party have felt in their large new yellow traveling coach when driving away from the Tuileries that summer night through the muddy country, all in the dark! It seemed for some time that all was well, but Louis was recognized, and the carriage had to turn back to Paris. Paris received them in silence, but the excitement was intense, and the news spread over the country that the king had betrayed them, and could no longer be trusted.

The red cap procession to Paris singing the Marseillaise

When the Garde Nationale was formed in Paris, other towns throughout the kingdom formed similar companies of soldiers, and it was about this time that the Garde of Marseilles, right away in the south, on the shores of the Mediterranean, were called to Paris to prevent the king and the nobles having their own

THE REIGN OF TERROR IN FRANCE



During the last fourteen months of the Revolution, scenes like this were witnessed daily in the streets of Paris and other cities. Thousands of innocent victims were taken in rough carts to the place of execution, there to be beheaded by the guillotine, and as they passed along the crowds jeered and insulted them.



At last the people became tired of so much bloodshed, and some of the more cruel leaders who had ordered these wholesale executions were themselves put to death, and more moderate men took control of affairs. This picture shows some of the victims of the Terror; the gaoler is reading the list of prisoners doomed to die.

way and undoing the great work of the Revolution.

Try to imagine the heroic march of these men, in the hot summer weather, their arms and uniforms shabby and dusty, with a banner in front bearing the words: "The Rights of Man." Some wore the red cap of liberty, with tricolor rosettes, some cockaded hats with waving feathers. Branches of trees, stuck in the gun barrels, sheltered the men from the sun. The drums marked step, and they sang as they marched the most inspiriting of all songs—"The Marseillaise"—now the national hymn of France, the words of which, to be found on another page, have often been sung since by armies and vast crowds of people whose blood has been set tingling in their veins. As the men of Marseilles rolled out the words: "Allons, enfants de la Patrie"—"Come, children of our country"—the crowds they passed shouted back in excitement the chorus, as they picked it up: "Aux armes, citoyens!"—"To arms, citizens!"

THE WAY THE PROCESSION CAME TO PARIS, AND THE END OF LOUIS CAPET

Many joined them as they passed on through France, by Avignon, where the Popes once lived for seventy years; by Lyons, now so famous for silk; over hills and dales, across wide plains, and so ever towards Paris, past the wide Rhone, reflecting the red moon, past the nightingales singing in the woods, past the towns and the hovels and the castles, and the men at work on the threshing floors, past the blackberries in the hedges and the little wondering children who sang back to the soldiers: "Allons, enfants de la Patrie." These 500 Marseilles men, who knew how to die, left on July 5. By August 10 they were in Paris, heading a furious attack on the Tuileries. The king and Royal Family escaped to the hall where the Assembly were sitting, but the faithful Swiss Guards were almost all killed, as told on page 1820. It is to their memory that the famous lion at Lucerne, in their native country, has been carved out of the face of the rock.

"Is Louis Capet guilty of conspiring against Liberty? If guilty, what punishment?" were the questions now argued for four days in the Assembly. Capet was the family name of Louis XVI., recalling the line of kings—eight centuries long—descended from Hugh Capet; it was chiefly in consequence of their sins that Louis XVI. was found guilty and condemned to death as an enemy of his country. He met his fate with the same calm courage as Charles Stuart had done over a century before in England.

HOW A GIRL OF FIFTEEN CAME TO PARIS AND HOW SHE LEFT IT

Not long after, the Widow Capet, as they called poor Marie Antoinette, of whom we read on page 1187, met the same fate. There is a bitter contrast in the way she came to France, and the way she left it. We see a beautiful, high-spirited girl of fifteen leaving her home in Vienna to be married in a distant country. As she passed in pomp and state through sympathetic crowds, her tears flowed—it was hard to say good-bye for always, at fifteen, and she had many brothers and sisters. Little more than twenty years afterwards we see a white-haired, sorrowful woman, with noble courage and dignity, standing in a common cart, her hands tied behind her, passing through yelling and insulting mobs, eager to see her die.

Nearly all the nations of Europe rose against France on account of these doings of the Revolution, and the Convention that then ruled the country had hard work to manage the war. But they succeeded in driving back the invading armies.

In Paris, violent quarrels arose in the Convention. Some wished one sort of government, some another, and it ended in the strongest party deciding that men must be forced to do as they wished, through fright and terror. The last fourteen months of the Revolution are called the Reign of Terror, and it is believed that at least 17,000 persons lost their lives in this awful time.

WHEN THE CHILDREN OF FRANCE PLAYED WITH TOY GUILLOTINES

There is a handsome square in Paris now called the Place de la Concorde, then called the Place de la Révolution, and here a tall wooden machine, called after its inventor, the Guillotine, stood always ready to cut off the heads of the condemned. No one was spared who was even suspected of not agreeing with the party in power. Children

NAPOLEON'S ARMY CHEERING THE EMPEROR ON THE BATTLEFIELD



Napoleon led his armies through many scenes like this, which shows us the battle of Friedland, against Russia—so terrible for both sides that if such slaughter had continued neither France nor Russia would have had any fighting men left. The French artist Meissonier here shows Napoleon's cavalry cheering the Emperor as they charge the enemy.

were given toy guillotines to play with, women wore brooches in the shape of tiny guillotines, and, worse still, women sat knitting and chatting in the square while the carts rumbled up and the heads fell. And not only in Paris, but in the towns of the provinces, guillotines were set up, and thousands of innocent people perished.

At last the terrible madness of killing showed signs of wearing itself out, and the more moderate party succeeded in getting some power. Marat, who had done so much to cause the horrors by the teaching in his newspaper, was killed by a young woman named Charlotte Corday, who thought it would be a noble deed to free her country from such a monster, and many others who had tried to force men to obedience by the terror of the executions perished by the guillotine even as their victims had done.

THE COMING OF THE BRONZE-FACED MAN IN THE MARTIAL CLOAK

The Reign of Terror came to an end when Robespierre and his followers were brought to the fatal steps of the guillotine. Robespierre had been a leader of the violent party all through, and could sway men by his clever speech and his absolute determination. There was, however, from time to time, fighting again in the streets of Paris. Royalists were trying to restore the Monarchy. The Directors, who then had the duty of carrying out the new Constitution, chose a young artillery officer to lead the Republican soldiers against them. Citizen Bonaparte they called him. He had done well in defending Toulon, the naval station on the Mediterranean near Marseilles, and was now in Paris, looking on.

Let us take a good look at the clear-cut, strong face as the young officer gives the command to fire, and his guns roar and thunder round the Church of St. Roch. You can see the marks of the grape-shot on St. Roch to this day. No more resistance by insurrection for the time was possible. "Citoyen" Bonaparte was loudly called to be "General" Bonaparte, and from this time onwards for twenty years this short, bronze-faced man became not only the most living power in France, but in Europe. All European history for these twenty years is troubled and overshadowed by the figure in the full martial cloak and the cocked hat.

NAPOLEON, THE MAN WHOM NOTHING COULD HOLD BACK

Napoleon Bonaparte was the son of a lawyer in Corsica, and had to learn to speak French at school; it is said that he always spoke French with an Italian accent. He had many difficulties to face before he could place his foot on the lowest step of the ladder of fame; but he overcame them because he was a genius, with abilities above ordinary minds, and he had an intense power of making others believe in him and adore him. When he once made up his mind that a thing was possible, no mere difficulties daunted him. He led his starving and ragged soldiers, when he first took up the command, to a series of brilliant victories in the pleasant, fertile fields of Italy, against the Austrians. Then, with his unerring eye, seeing how important Egypt was to the British, on the road to India, he carried his troops there to fight the Mamelukes and establish a footing for France. "Soldiers," runs his well-known speech as he encouraged them under the hot sun, "forty centuries look down on you from these pyramids."

Fortunately for British plans, Nelson was able to destroy the French fleet in the battle of the Nile, and the victorious army had to stay for a time prisoners in Egypt. Napoleon himself returned in a single ship to France, and succeeded in changing the form of government, and in having himself made First Consul. As soon as he had shown he could manage the affairs of the country as well as he could lead an army, he dashed off again to Italy, which the Austrians had won back. This time we see him leading his men over the rocks and ice and snow of the St. Bernard Pass, cheering them on with the music of the band. How surprised the Austrians were when the Army swung down upon the plains! The great victory of Marengo followed, but at the same time the army left in Egypt was defeated by the British.

FRANCE IS AT PEACE AGAIN, AND NAPOLEON IS CROWNED BY THE POPE

In the peace that followed, the First Consul found time to start many good works at home—roads and bridges were

THE MARCH OF A BROKEN-HEARTED ARMY



To punish the Russians for disobeying his orders, Napoleon marched with a large army across Europe and seized their ancient capital, Moscow. But the Russians set fire to the city and fled, and the French troops could not get sufficient shelter or food. Winter, too, was coming on, and Napoleon had therefore to retreat.



The French army was hampered in the retreat from Moscow by thousands of camp followers, including women and children, and it was by the bravery of Marshal Ney, seen in this picture commanding the rear-guard, that any returned to tell the story. Of half a million men who set out only a few thousands came back.

made, trade was encouraged, education was improved; French families who had fled in the Revolution times were allowed to return in peace; services were again held in the churches. Soon the time came when the Chief Consul succeeded in once more changing the form of the government of France, and this time he became Emperor—Napoleon I.—and set up a splendid Court, making princes and princesses of his brothers and sisters, dukes and marshals of his generals. He made the Pope go to Paris to anoint him Emperor at Notre Dame, and crowned himself and his wife, Josephine, with a beautiful golden laurel wreath.

Again Napoleon crossed the Alps, this time to be crowned King of Italy, with the famous iron crown of Lombardy.

Many traces of Napoleon are to be found in Switzerland, chiefly in the magnificent roads he made, or planned, over the mountain passes.

THE COUNTRY THAT NAPOLEON COULD NOT CONQUER

His next plan was to conquer England, but the "silver streak" of the Channel and the Navy saved it; the large army gathered at Boulogne was finally marched off to help in the Austrian campaign. Another of Napoleon's great victories was soon won. After Austerlitz, the English Minister, Pitt, said sadly: "Roll up that map of Europe; there will be no need for it for ten years to come," meaning that Europe was to be a battlefield for ten years more. Napoleon had now plenty of kingdoms to give away, and he made his brothers and his sisters rulers over some of the conquered states.

To ruin Great Britain, which had just won the important victory of Trafalgar, and which he could not conquer, Napoleon ordered all Europe to close their ports to British ships, so that no British goods could find a market. Most of the countries had to obey, and much loss and suffering followed. But Portugal refused to agree, and Great Britain sent an army to help her, under the general who was later the Duke of Wellington. The French were slowly and surely driven out of Portugal, and finally out of Spain across the Pyrenees. Napoleon's plan also led to war with Prussia and Russia, and although he defeated these countries at the battle of Friedland, after a terrible campaign, he was glad to make peace at Tilsit.

Soon after this Napoleon married an Austrian princess, and their little son was called the King of Rome from his cradle, as we read elsewhere. Great was Napoleon's joy over his boy, for now he thought the Empire was sure to last, and his son would reign after him.

HOW NAPOLEON MARCHED TO MOSCOW AND FOUND IT A CITY OF FIRE

By this time France was tired of incessant war, for thousands of the youngest and finest men were drawn away from their homes, often never to return; and money had to be found, for there is nothing more wasteful and useless than spending money on building battleships, and firing guns, and sending men away to be killed in fighting. But Napoleon wanted to punish Russia for breaking his decree about trading with England, and he led an army into the heart of Russia, to Moscow itself. The Russians could not prevent his doing this; but, as we read on page 2063, they burned their holy city, and destroyed or carried off all the food they could, so that the French had to start home again in snow and bitter cold winds. The retreat from Moscow is one of the saddest events in history. All France had been darkened by the shadow of the sword, as her youngest and strongest sons were drawn from their homes to fill up the ranks of the Grand Army, together with such Germans and Poles as could be collected on the way. Some 400,000 or more, with cannons and horses and bands, and wearing fine uniforms, set their faces bravely eastwards.

THE STARVING TRAIL OF MEN IN RAGS, FOR WHICH FRANCE SUFFERS TO THIS DAY

A few months later, back on the same long route, there crept a starving trail of men in rags, in utter misery and dejection, for eight long weeks. And the rest? Burned in the fires of Moscow, left in Russian prisons, dead under the snow, or under the ice of the frozen rivers. For Napoleon, who till now never forgot, never failed to foresee and plan everything with wonderful skill, seemed suddenly to lose his great powers. He had forgotten how soon bitter winter comes on in Russia; he had forgotten the army was thinly clad

and that stores of food must be had for men and horses; he had forgotten to make arrangements in case his plans did not turn out as he expected.

Napoleon left his army as soon as it was out of Russia, and hastened to Paris.

THE END OF NAPOLEON'S EMPIRE, AND HIS FINAL DEFEAT

He soon had a new army ready for the field, but his downfall was at hand. Russia, Prussia, Sweden and all the German princes, except the King of Saxony, joined in a "League of Liberation" against him. In the early part of the new war he had some success, but even his father-in-law, the Emperor of Austria, joined the league, and Napoleon was badly defeated in the Battle of the Nations, at Leipzig, when for three October days he fought desperately to maintain the supremacy of the French. This did not end the war, but Napoleon was gradually forced back into France. His army in the south was driven out of Spain by the Duke of Wellington; and seeing that the struggle was hopeless the Emperor went back to Paris, and gave up the throne in favor of his little son. But this did not satisfy the other powers. They decided that his son should not reign. The crown of France was given to Louis XVIII, a brother of Louis XVI, and Napoleon was banished to Elba.

Within a year, as we read on page 792, he escaped from Elba, and, raising an army as he went, marched back to Paris. Louis fled, and Napoleon reigned again for a brief period of a hundred days. It was only a flash of his old glory. On June 18, 1815, his best troops were beaten back by the British army, under Wellington; and the Prussian army under Blücher completed the work by turning the retreat of the French into a scattered rout. Napoleon again abdicated, and, after he had vainly tried to reach an American vessel, took refuge on a British warship. The allies decided that he should be banished to the desolate island of St. Helena, and there the great soldier wore out the rest of his days in useless repining.

AGAIN A MONARCHY UNDER THE FAMILY OF HER ANCIENT RULERS

Napoleon's conquests were all taken from France by the congress which met at Vienna to settle the affairs of Europe, which he had upset, and Louis XVIII was again placed on the throne. Louis would gladly have gone back to the old order of things, and ruled the country in the way that his fathers had done. But the old belief that the country belonged to the king was gone forever. A spirit of freedom, and love of liberty had spread through the nation, and survived Napoleon's absolute rule, and Louis was compelled to grant a charter which recognized the doctrine that all men were free and equal before the law. This was not the only good thing that had come from the troubled times that the people had come through. If Napoleon had not turned his attention to conquest, he would have been a very great statesman, and all that was best in his rule was kept.

Louis died in 1824, and was succeeded by his brother Charles X. But Charles had so strong a desire to rule as a despot that, in 1830, the people rose against him. Charles was deposed, and Louis Philippe, a descendant of Henry IV in another line, was made King.

Just before Charles was deposed, France had a war with Algiers, to punish the Dey, who had been behaving very badly. The Dey was banished, Algiers was placed under the protection of France, and this was the beginning of the French colonial possessions in Africa.

Louis Philippe, who had wandered about a good deal, and was very poor, professed love for the principles of the Revolution so that he might get the crown; but he was quite as anxious as his predecessors to return to despotic rule. In fact, at this time all the kings of Europe, and their counselors, were trying to hold back the progress of democratic government, and in every country but England and France, they succeeded. Louis Philippe was compelled to grant the country a new charter, and promise to govern by it. He admitted that he was king of the French people, instead of King of France, and he acknowledged that he was crowned by the will of the people. In spite of this, however, he betrayed his desire to be an absolute ruler, and this proved to be his undoing.

A PRESIDENT WHO BECAME AN EMPEROR

Ever since the Revolution there had been a party in France which thought that a republican form of government was best. This party grew in strength as the people realized that Louis Philippe was trying to gain more power. There

were a number of small revolts during his reign, and finally, in 1848, he was deposed, a republic was proclaimed, and the legislature proceeded to draw up a constitution.

There was a good deal of distress among the people, and the new government tried to overcome this by establishing, in Paris, national workshops, where every one who was out of employment could find work. Naturally this curious, but interesting experiment failed. Work could not be made for the numbers of workmen who flocked to the capital, and the workshops had to be closed.

Meanwhile another change of government was coming. Louis Napoleon, a nephew of the great Napoleon, had been chosen as one of the members of the republican legislature. He succeeded in winning the confidence of the people, and when an election for president was held by universal manhood suffrage, in 1849, he was elected.

The new President meant from the first to become emperor, and used the presidency as a stepping stone only. There was a good deal of disorder in the country, which it was difficult to quell. This helped him to gain power, and within a few years he was able to overthrow the constitution and persuade the people to make him emperor. He took the title of Napoleon III, because the young son of Napoleon I had nominally reigned for a few days.

Very soon the constitution was in part given back. Napoleon's rule was mild and for a time the people were content under the imperial form of government—the Second Empire it is called. During the years that had passed since the Revolution, and in spite of all its political troubles, France had grown in prosperity. Napoleon fostered trade and commerce and manufactures. Paris was partly rebuilt and made the beautiful city that it is to-day, and the first of the great expositions was held in that city. Napoleon's reign was a time of splendor. If he had been able to keep out of war, all might have gone well; but this he did not seem to be able to do.

THE TRAGEDY OF A WAR THAT RUINED AN EMPIRE

The Crimean War, in which England joined with France in 1853 to save Turkey from Russia, was mismanaged, but Russia was defeated. Napoleon went to war with Austria in 1859, to help the Italians in their struggle for unity, and though he made peace with Austria too soon to be of great help to the Italians, he got Savoy and Nice for France in return for the assistance he gave. In 1862, he attempted to create an empire in Mexico, but this the United States would not allow, and he was compelled to withdraw his troops. The army, however, had not been beaten since Waterloo, and when the Emperor allowed himself to be drawn into war with Prussia, the nation, as a whole, was sure of victory, and the soldiers, who thirsted for glory, marched gaily off to battle.

The result was disastrous. Bismarck, the great Prussian Chancellor, was anxious for a war with France, because he saw in it a means of uniting Germany, with the King of Prussia as its dominant lord. The Prussian armies, which had been victorious over Austria a few years before, were ready, and as Bismarck was able to throw all the blame for the war on France, the princes of Germany rushed to Prussia's aid. Terrible defeats were inflicted on the French, who were not ready and were badly led. The Emperor was taken prisoner with his whole army at Sedan; Paris had to endure the most dreadful siege in all its history, and the victorious Prussian king was proclaimed German emperor at Versailles.

Napoleon was deposed and took refuge in England, and since that time, France has been a republic. The terms of peace imposed by Prussia were harsh and humiliating. Alsace and part of Lorraine were taken from France, and the country was obliged to pay an immense sum, called an indemnity, to the Prussians, and a number of French towns were held by Prussian and German troops as hostages until this sum was paid. To the surprise of the world this was quickly done. The hostage cities were recovered, and in the years of peace which followed, the country regained more than its old prosperity.

THE STORY OF THE COMMUNE IN PARIS

Before order was restored, however, Paris went through another terrible experience. During the siege the government had been moved to Bordeaux, and as soon as the Prussian troops were withdrawn from the city, it was seized by the mob. The people established a sort of

government, which is generally spoken of as the Commune, and held the city for months. They barricaded the streets, armed bands went about setting fire to some of the public buildings which had escaped the fire of the Germans. Notre Dame escaped, but the Palais Royal, the Tuileries and the City Hall were destroyed. Finally, the soldiers fought their way into the city, the Commune was compelled to surrender, and thousands of the people lost their lives. Since that time Paris has never regained the great power in the country that it had before.



This is the beautiful Town Hall in Havre, which owes its importance as a war harbor to the two Napoleons. Havre was made the seat of the Belgian government during the Great War when Brussels was threatened.

THE PEOPLE DEFINITELY DECIDE TO HAVE A REPUBLIC

When the republic was declared, a provisional government was established, very much as in our own day a provisional government was established in Russia. This only lasted until a National Assembly was elected by the people. The Assembly chose Louis Adolphe Thiers as its president, and carried on the government until peace was made, the indemnity paid, and the last of the Prussian troops removed from the country.

After that, it seemed possible that the monarchy might be restored. But the heir of Charles X, whom a number of people desired to make king, refused to reign unless the tricolor, as the flag of France, was replaced by the white flag with the golden lilies of his forefathers. This foolish action settled the matter. To the great majority of the people, the "blue, white and red" stood for their adored country, for which their fathers and sons had fallen and died, and they would not have the man who scorned it to rule over them. The National Assembly quickly set to work to draw up and adopt a short constitution which settled the form of republican government, and the story of France of the Revolution was ended. This was in 1875, and with a few amendments, the constitution as it was then passed still stands.

Napoleon died in 1874, but for a number of years the Imperialist party in France hoped that an opportunity might come to restore the Empire, and place his son, the young Prince Imperial, on the throne. These hopes were destroyed when the young prince, while serving as a volunteer officer in the British army, was killed in South Africa, bravely fighting in the war against the Zulus.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2415.

NAPOLEON AT FONTAINEBLEAU



Napoleon was one of the greatest conquerors and rulers that the world has ever known. By the unaided power of his great personality he rose from a poor Corsican boy to the position of ruler of all France—nay, almost all Europe. Here we see him at the beginning of his downfall, the first time he was forced to abdicate the throne. He is about to embark for Elba and is saying farewell to his soldiers, who idolized him. His parting from his generals at Fontainebleau, when he kissed the eagle on his standard good-by, was one of the most pathetic scenes in a life of great victories and overwhelming defeats. He led them once more, but only to meet another great defeat.



THE WONDER OF TIME & TIDE

CONTINUED FROM 2211

IN the study of Nature we usually find that changes which go on, such as night and day or the seasons, do not go on always in a particular direction, but go and come, go and come—so that, after they have happened twenty or a million times, things are exactly as they were before. These changes which seem to go round in a circle are usually called cyclic changes, and the study of Nature is full of these cycles. Day and night is the one we know best, but that is a very short cycle compared with many. In the study of the solar system, we find many cycles compared with which day and night are not a moment.

For instance, there is a slow kind of wobble of the earth upon its axis—the line running through it from Pole to Pole—which occurs in cycles twenty-six thousand years long. Further, the paths in which the planets travel get more or less tilted to each other instead of all being on the same level as if they were traced on this paper; and these tiltings go and come in huge cycles that last for countless ages.

Then again, as instances of shorter cycles in Nature, there is the movement of water on the earth, from sea to sky, then as rain forming streams and rivers, and back to the sea again; and there is the cycle of the elements, such as the carbon of carbonic acid, traveling from air to plant, plant to animal, and then from the animal back to the air again.

All these cycles and thousands more are vastly interesting in many ways, and we cannot understand them too well. Yet there is one point of view from which they are not so interesting. They are the causes of a great many things that happen on our earth and in the universe; but as, at the end of a cycle, things are what they were at the beginning, *they do not lead anywhere.*

Suppose that amid all these great workings of Nature we could find some little thing that happened and went on happening, but always in the same direction, or, at any rate, not bringing things back just as they were, then, though this might be something that at any moment could scarcely be noticed it would be in one way, a million times more interesting than any of these cyclic or circular changes.

In the one case things are just spinning round and round so to speak, and, however cleverly and wonderfully they spin, it is still only round and round; but in the other case things are going somewhere, and the question is—*where?* They may be doing so very slowly, so slowly that the whole length of the life or

mankind may be nothing compared with it, but yet, as there is no end to time, they must in the long run utterly change the world if they really go steadily on and do not turn back upon themselves. So we are bound to be more interested, after all, in the smallest thing that goes on in one direction than in the biggest thing that comes back to where it started, even though that coming back should take a million years. With this in our minds let us come to study the tides.

HOW MEN FIRST THOUGHT THE EARTH WOULD LAST UNCHANGED FOR EVER

In studying the solar system, men found first that the sun was in the centre of it, next that the planets moved in a particular way round the sun, and next that the sun and the planets were balanced by the law of gravitation. Then they studied the way in which the planets were affected by each other through gravitation, and they came to the conclusion that the solar system is what we call a stable thing—that is to say, a thing so made that, as long as nothing disturbed it from outside, it would last as it is now for ever. But in their studies they left out of account one thing, and that is the tides. They made their calculations about the sun and the planets and their moons as if each of these bodies was and always had been a perfectly solid, rigid, unyielding mass of matter. They could prove on paper that these masses of matter at their present distances from each other and with their present movements would undergo slight changes between themselves, but that these would only be cyclic changes, and that therefore the solar system was made as if to last for ever.

TIDES ON THE SUN, ON THE MOON, AND ON THE EARTH

But we all know that it is not true to think of the earth as a single, solid, rigid piece of matter. If no other evidence were to be had there would still be the evidence of the tides, which all can see. Now, these tides are made mainly by the attraction of the moon, but the attraction of the moon acts on all the matter of the earth as well as the surface. So, if the inside of the earth is not rigid, but liquid, as the earth spins, tides must be caused inside it by the moon. If the inside of the moon is still liquid, as it may be, the earth must cause disturbances there too.

Then take the case of the sun. We have already learnt enough about the sun to know that he is as different as can be from a solid, rigid, unyielding mass of matter. If there is any force of gravitation to raise tides on the sun as he twists, he is certainly very well suited for producing the most tremendous tides we can imagine. It is a necessary consequence of the law of gravitation that every planet, and the moon of every planet, must raise tides upon the sun as he spins upon himself once in every twenty-six days or so.

One at least of the planets, Jupiter, is so big, and therefore has so much power of gravitation, that the tides it raises upon the sun must be by no means small. Jupiter itself is probably still a kind of very small sun, and is certainly anything but rigid and solid, for different parts of Jupiter spin round at different rates, just as we have seen in the case of the sun himself. So Jupiter's moons, and the sun, not to mention the earth and other planets, must raise tides upon Jupiter. The same is true of Saturn.

HOW WE KNOW THAT THE TIDES WILL CHANGE THE WHOLE EARTH

All this is enough to suggest that perhaps the question of the tides is a very much bigger one than we had thought. At any rate, it is quite certain that we must discover what the tides do in the solar system before we can be quite sure that it will endure for ever as it is now. The old calculations did not take the tides at all into account, and perhaps they make a great difference. A great English astronomer, Sir George Darwin, worked at this subject for many years, and he and others have taught us to discover in the tides a source of change which, though it acts very slowly, yet acts in a certain direction and not circularly, so that in the long run (though how long this takes we can scarcely guess) the tides must utterly change the solar system as we know it now, and as they have partly made it, into something very different.

Let us just remind ourselves of the simple facts about the tides we know best. The connection of earth-tides with the moon has been known for thousands of years, though of course gravitation was not then known. We

now understand that as the earth spins under the pull of the moon, the water next the moon is heaped up, forming the high tide, while the solid body of the earth is pulled towards the moon more powerfully than the water on the far side of the earth is pulled towards it.

THE TUG-OF-WAR BETWEEN THE SUN AND THE MOON AGAINST THE EARTH

So the earth is drawn away from the water, and the water left behind forms a high tide on the far side of the earth as well as on the side next the moon. In between the two, on the parts of the earth between these points, we shall find the low tides—as the water cannot be in two places at once. The sun acts in exactly the same way as the moon, only with less power, as the sun is so much farther away. The pull of the sun and the pull of the moon must be in about the same line when the moon is new or when it is full. But at other times the moon and the sun are pulling more or less at right angles to each other. So, when the moon is about new or full, we have high tides that are higher, and low tides that are lower, than at other times. These biggest tides are called spring tides, and the others are called neap tides; the spring tides being due to the sun and moon helping each other, and neap tides due to the sun and moon opposing each other—that is to say, being due to the pull of the moon *minus* the pull of the sun. The moon is much nearer, and therefore stronger, and so wins in this mighty tug-of-war.

The tides take about six hours to rise to their highest and about the same to fall to their lowest point.

HOW THE TIDES ACT LIKE A BRAKE ON THE SPINNING EARTH

Now, it can be proved beyond dispute that these great tidal waves, constantly traveling round the earth as it spins, act like a brake upon a spinning wheel. The power of the tides comes from the power with which the earth spins, and so the tides are constantly drawing upon that power. This means that the earth must be spinning less quickly from day to day. The tides are increasing the length of the day. No doubt the difference between to-day and to-morrow is a very small one, and any guesses we can make as to the rate at which the lengthening of the day goes on are very doubtful, and not worth remembering, but there is no doubt at all that this change is really going on.

We can prove also beyond dispute that another consequence of the tides is that the moon is getting farther away from the earth. As the moon does so, it must take longer to travel round the earth—in other words, *the month and the day are both getting longer.*

We can trace the course of change both backwards and forwards, and in each case our conclusions agree wonderfully with what we can learn in other ways. If the moon is now traveling away from the earth, it must once have been nearer the earth than it is at present, and the month must have been shorter. If the day is being lengthened because the earth's spinning is retarded by the tides, then the day must once have been shorter. If we go back far enough, we find that the day must have been not longer than about four hours. We are not entitled to go back farther still, because we believe that if the earth had spun much quicker than this—that is to say, if the day had been much shorter than this—it would have spun so fast that it must have flown in pieces.

WHY IT IS THAT WE SEE ONLY ONE SIDE OF THE MOON

Now, if we trace back the history of the moon and the month, we find that when the earth spun upon itself in about four hours, making a four-hours day, the moon must have gone round the earth in four hours, making a four-hours month. But this is just as if the earth and the moon had been one body, only with a break between them, for they spun round together. We only need carry our minds a little farther back in order to conclude that before this time the earth and the moon must really have been one body; in other words, that the moon is a broken off portion of the earth. Now, that is exactly what we have reason to believe on other grounds, and so it is very interesting and important that the study of the tides and their influence on the earth to-day should have brought us back to a state of things when the earth and the moon must have been one.

We may here remind ourselves of something we have already learned. It is that the moon spins upon itself in just the same time as it takes to go round the earth, so that, as we know, we

always see the same face of the moon. It would be a most extraordinary thing if it were a mere chance that the time of the moon's traveling round the earth and the time of the moon's spinning on itself are just the same length. But it can be shown that it is not a chance; on the contrary, that it is what we should expect if this theory about the moon and the tides and their history is true.

WHEN ONE DAY MAY BE AS LONG AS TWO MONTHS ARE NOW

It is interesting also for us to know that, when the moon becomes cold all through—so that it is rigid, and so that any tides in its interior must cease, as they have long ceased upon its surface—then perhaps the law which compels the moon to spin upon itself in just the same time as it takes to travel round the earth will cease to apply. Thus, at some remote date, the moon may go on spinning upon itself at the same rate as at present, but take longer than at present to travel round the earth. This will mean that, if the human race still exists upon our planet, the astronomers of that distant day will be able to see the other side of the moon.

But that is quite a small point compared with the great things which the study of the tides leads us to expect as regards the future. The moon must go farther and farther from the earth, and take longer to travel round the earth; and the earth's day must steadily grow longer. But it can be proved that these changes will not go on at the same rate. The day will grow longer more quickly than the month does—indeed, that must be happening now; and in millions of years to come the month and the day must again be of the same length as each other, as they were when the moon was first formed from the earth. Only, whereas their length at first must have been about four hours, their length then will be about fifty-seven of our present twenty-four-hour days.

WHY THE TIDES ON THE EARTH MUST ONE DAY CEASE

The moon will then be at a great distance from the earth, and so will take all that long time to travel round the earth; but the brake action of the tides will have so much slowed the earth's spinning that the earth will also take fifty-seven days to spin round upon itself. This means that the moon and the earth will spin round together as if a great bar of steel ran between them, only the force holding them is not steel, but the force of gravitation; and if we could try to replace gravitation by a steel bar, we should find the moon too small to hold its end of a steel bar big enough to do the work which gravitation does so easily.

Now, if there were only the earth and the moon to consider, it could be proved that this state of the earth-moon system which we have just described would be a durable one; but we still have to reckon with the sun. The tides raised by the moon upon the earth will one day cease because, as we see, the earth and the moon will go round together as if a bar of steel ran between them. But there will still be the sun-raised tides upon the earth, or disturbances corresponding to tides in the fluid matter inside the earth. We have left these out of account so far, because they are so much less powerful than the tides raised by the moon; but still, there they are, and there they will be when the moon-raised tides have ceased; and then, as now, they must act like a brake on the spinning of the earth.

THE TIME WHEN IT WILL BE LIGHT AND DARK FOR WEEKS TOGETHER

Now, this means something which you and I can scarcely imagine, so strange does it seem. It means that the moon will travel round the earth in less time than the earth takes to spin on itself. The month will actually be shorter than the day. That is so very different from what we find at present that we can scarcely believe it. But if we turn to another planet that has a moon (or rather two moons), and if that planet is smaller than the earth, so that its changes go on more quickly, and so that it may now be in a state which the earth will not reach for ages, then we shall actually find just this extraordinary thing that astronomers foretell for the earth and its moon.

The wonderful planet Mars, our outer planetary neighbor, is much smaller than the earth, is probably much older than the earth, and has two moons, which were discovered less than fifty years ago. The inner of these moons travels round Mars more than three

times while Mars spins round once on itself—that is to say, the day of Mars is more than three times as long as the month, if we measure the month by the inner of the two moons of Mars. Time was, not so long ago, when this extraordinary peculiarity about the movement of this moon of Mars could not be explained; but now we can explain it by supposing that the spinning of Mars has been retarded by tides raised by the sun, just as is happening, and will continue to happen, on the earth.

THE SLOW CHANGE THAT THE TIDES ARE MAKING THROUGH THE CENTURIES

It is perhaps possible for us to trace the future history of the solar system, as the tides will affect it, a little farther than we have done, but it would be little more than guess-work. The great point for us to remember is that in the action of the tides we find something which, though it acts so slowly that we cannot see its results, is yet acting in a definite direction from which there can be no return. The solar system has not always existed, but is a product of change acting throughout great spaces of time; nor can it exist for ever, for changes are still going on in it which, in the course of ages, will make it very different from now.

We may end this part of our story by noticing two other kinds of change in the solar system which, just because they go on steadily in one direction, are of such great importance. The first is that the whole system is steadily cooling; the sun and the planets are all losing their own stores of heat. Each of them catches a little heat and light given out by the others, but by far the greater part of it is scattered into space; and though it goes somewhere, and is not lost to the universe, it is lost to the solar system. We have lately learnt that the sun and the planets are making heat within themselves from something, but that something cannot last for ever. The heat and light the solar system receives from the stars are nothing compared with what it loses, and it must one day grow cold.

Yet another change is always acting in one direction, and that is the change produced by gravitation. Under its influence the sun and the planets are shrinking, and we must suppose that in the long run all the bodies which now travel round the sun and constitute his system, including the earth, must be at last drawn into the sun, and then the solar system will be no more.

THE ETHER THAT WILL ONE DAY MAKE THE SOLAR SYSTEM ONE ROUND BALL

Quite lately astronomers have come to see that there is another question. The planets and their moons, as they move, are moving *through something*. That something is not the air, for the air is the outer part of the planets or moons that have an air, or atmosphere. It is the ether. We are perfectly certain that the ether really exists, and we already are beginning to learn just a little about it. Now, the question is whether the ether must not slow down the movements of bodies passing through it. Must there not be at least *a little* friction and resistance, as when a fish swims through water, or a bird or a bullet flies through the air? Probably the ether does have such an influence. Its influence is certainly, if it exists, very small. But the smallness of a process does not matter if it goes on in one direction, and if there is no limit to time. It is the slowing action—infinitely slow—of the ether that will probably help, some day, to make the solar system into one dead round ball—perhaps the very state in which it began, ages ago, when it met some other body in the sky, and was scattered into a nebula.

THE REALLY WONDERFUL THING IS THAT WE WONDER AT ALL

But when we speak of the past and the future of our system as influenced by the tides, by loss of heat, and by gravitation, we must never forget that the time which these changes take is infinite compared with our own lives. No one has imagination enough really to understand how great are the stretches of time with which astronomy has to deal, any more than we can really understand the size of the spaces and the distances with which astronomy has to deal. The really wonderful thing is that we human beings should have the power, as we spend the brief moments of our life on this tiny earth, to gain, at any rate, some little idea of the grandeur and the majesty and the mystery with which we are surrounded.

THE NEXT PART OF THIS IS ON PAGE 2389.

TOBY AND THE FAIRIES OF THE CHIMES



When the chimes began to ring many wonderful things did Toby see. The spirits of the bells were swarming all around him; goblins and fairies and elfin spirits in endless numbers were pouring out in all directions from the chiming bells, until the whole interior of the tower seemed thronged with them.

THE STORIES OF CHARLES DICKENS

WE have already read the most famous of all the Christmas books written by Charles Dickens, and we are now to read two more which are almost as well known as his "Christmas Carol." Indeed, it is difficult to say whether "The Cricket on the Hearth" or "A Christmas Carol" is the greatest favorite with his readers. Certainly they are both most delightful stories, not only for Christmas, but for all the year round, and "The Chimes," which is described as a "goblin story of some bells that rang an old year out and a new one in," is always popular.

THE CHIMES—A GOBLIN STORY

CONTINUED FROM 2226

WE have all listened at some time or other to the music of the church bells as they ring out their pleasant chimes every quarter of the hour. The chimes we are now to hear about ring also in four quarters, and the story they tell us in ringing the first quarter runs something like this.

There was the quaintest old fellow you could imagine, named Toby Veck, but better known as "Trotty," because he had a funny little way of walking which gave him the appearance of "trotting." He could not go even a little distance without this jumpy style of movement, and as he was employed, whenever he could get a job, in running errands for people in the district of London where the fine old church with the musical chimes stood, perhaps his little trot was useful; it certainly kept him warm in the cold weather.

As poor old Trotty had only the shabbiest of clothes and the leakiest of boots, it was no easy matter for him to keep warm in winter time. He wore knee-breeches and long gaiters, as some old-fashioned folk did many years ago; but all his clothes had been worn by other people long before they came to him. His tall hat, for instance, was so crushed that it had long been ready for the dust-heap, and even his little white apron, which indicated that he was a porter, had long ceased to be anything but a well-washed rag.



OLD TOBY VECK, THE PORTER

Times were very, very hard with Trotty; but he was a cheerful old soul, honest and always willing to do his best, on any errand he was sent, for the sixpence with which he was usually rewarded. But sixpences were few, and anything but "nimble," one winter when the weather was bad, and even Christmas scarcely seemed to promise better times. Trotty was down in spirits, and things would have gone badly with him but for his daughter Margaret, a bright and cheerful young woman, whose needle helped to keep her and her father in food. Margaret had a sweetheart, Richard, an honest young blacksmith, who wished her to marry him on New Year's Day; but even this good news hardly brightened the spirits of Trotty Veck, as everything at that time seemed to be against him.

Margaret had brought Trotty his dinner—a savory dish of tripe, which he relished greatly—and he was eating this on the steps of a gentleman's house, when out came that person, Alderman Cute, with some friends, who made some very unfeeling remarks about the food of the poor, so that Trotty's heart was down in his boots again. The alderman, however, gave him a letter to carry to a pompous old person named Sir

Joseph Bowley, M.P., and paid him only a sixpence for the errand.

As he trotted off gloomily with the letter, the chimes were pealing from the steeple, and they seemed to say to Trotty—at least he thought so—" Put 'em down! Put 'em down! Good old times! Good old times! Put 'em down! Put 'em down!" So ends the first quarter of " The Chimes."

THE LETTER THAT TOBY VECK CARRIED TO SIR JOSEPH BOWLEY

He thought himself a very remarkable person, this Sir Joseph Bowley, and he and his precious wife pretended to take the greatest interest in poor people; but they were really two self-satisfied humbugs, and were quite without pity for anyone but themselves. It turned out that the letter which Trotty had carried from Alderman Cute was to ask Sir Joseph about a certain Will Fern, who had just come to London from the country village where Lady Bowley carried on her pretentious work among the poor.

Will Fern, with his dead brother's orphan child, was really in London searching for a kind woman who had been a good friend of the girl's mother; he was out of work too, and had applied to Alderman Cute for advice and assistance. But as Will had not taken kindly to Lady Bowley's plans for improving the poor of her village, and had refused to spend his evenings at her class, making buttonholes, her ladyship did not hesitate to think him guilty of any crime, so that Sir Joseph dictated a letter to Alderman Cute advising him to have the rascal locked up.

TROTTY MEETS TWO WEARY WANDERERS AND BECOMES THEIR GOOD FAIRY

Poor old Trotty was almost dazed by the insolent way in which this good and kindly couple treated him, and also at the tone of the letter he had heard being directed to the alderman; so that he cut rather a stupid figure when he was asked to be off with himself and the letter. Still muddled in his mind, as he was trotting back, he ran against a man and a child in the dark streets, and got into conversation with them. To Trotty's surprise the man turned out to be none other than Will Fern searching for the house of Alderman Cute. So, as you may suppose, Trotty told him all he knew, and warned him not to go there on any account, but to come home with him to spend the night.

To think that he was to be of such great service to the poor wanderers completely changed Trotty's spirits, and as soon as he got home he was tremendously busy helping Meg to get supper ready, having bought a rasher of bacon and an ounce of tea with his sixpence, but refusing himself to eat anything, though he was starving, on the pretence that it was well known to his friends that he never cared, himself, for rashers nor for tea. " I like to see other people enjoy them," said Trotty, speaking very loud to impress the fact upon his guest; " but to me, as food, they're disagreeable."

Now the chimes were ringing again, and they seemed to say, " Toby Veck, Toby Veck, door open wide. Toby Veck, Toby Veck, door open wide." This was strange, and he determined to trot out and see if the door of the church steeple was really open, for he had seldom seen it open before.

THE BEGINNING OF TROTTY'S STRANGE ADVENTURES UP THE OLD BELFRY

Out he slipped without his cap or apron, and sure enough the door was open. In he went, and up and up in the darkness, climbing the steps and then the ladders, until he was among the bells, when a sense of dread and loneliness came upon him all at once, and he fell in a swoon. So ends the second quarter.

When the chimes began to ring Toby awakened, and many wonderful things did he now begin to see. The spirits of the bells were swarming all around him; goblins and fairies and elfin spirits in endless numbers were pouring out in all directions from the chiming bells, until the whole interior of the tower seemed thronged with them. But when the chimes stopped, the elfish figures, one by one, faded into nothingness, and then when the bells hung still Toby noticed for the first time that each bell was itself a strange and mysterious figure with a long beard, and its muffled hand on its goblin mouth.

He did not know what to do, he could not move away, and lo! the bells began to speak to him. They asked him all sorts of strange questions, and accused him of having done them a wrong for thinking that they had ever uttered a

harsh note against the poor or had ever sung, " Put 'em down ! Put 'em down ! Good old times ! Good old times ! Put 'em down ! Put 'em down ! " Toby was really greatly distressed at this, pleading that he had never meant to offend them ; and when the strange figures said, " Show him what he calls himself," he was aghast to see the tower open at his feet, and far below his own body lying dead ! A little fairy figure, the Spirit of the Child, now appeared to him, and showed him strange pictures of his own daughter Meg sitting at work in a miserable room with Will Fern's niece.

Then he heard them talk, Meg weeping bitterly the while, about the cruelty of their lives. And then he found himself transported to a great festivity at Bowley Hall, where Sir Joseph and his lady were celebrating the birthday of the latter, and he heard that a very rich banker had just shot himself !

WHAT TOBY VECK SAW AT LADY BOWLEY'S BIRTHDAY FEAST

But it was a very jolly banquet for all that, until Will Fern came in and said he had just come from gaol, a criminal, as the result of those good people's love of " putting down " the poor and unfortunate. Will's appearance caused a great disturbance at Bowley Court, and in the confusion Trotty found himself spirited away to a miserable garret, where Meg was hard at work, and Richard, the honest smith, in rags, came in to her to tell her that Lilian, Will Fern's niece, would take no help from her ; but next came Lilian herself to the garret, where she died of a broken heart. So ends the third quarter.

The Spirit of the Child appears again to Trotty and shows him a very cosy couple in their home. They are Tugby, the fat, lazy porter to Sir Joseph Bowley, who has married Mrs. Anne Chickenstalker, the jolly widow who keeps a " general shop " where Toby owes some money.

He hears them speak of Meg, and of Richard having taken to drink, and—well, altogether poor old Trotty has been having a very bad dream, which is only brought to an end by the dear old chimes ringing a joy-peal for the New Year, and his loving daughter Meg saying to him :

" And whatever you do, father, don't eat tripe again without asking some doctor whether it's likely to agree with you ; for how you *have* been going on ! Good gracious ! "

And then in came Richard, shining with happiness, who kissed his wife that was to be, saying, " The first kiss of Meg in the New Year is mine ! Mine ! I've been waiting outside the house this hour to hear the bells and claim it."

THE GREAT CHANGE THAT CAME OVER TROTTY WHEN HE WAKENED

" You never in all your life saw anything like Trotty after this. I don't care where you have lived or what you have seen ; you never in all your life saw anything at all approaching him. He sat down in his chair and beat his knees and cried ; he sat down in his chair and beat his knees and laughed ; he sat down in his chair and beat his knees and laughed and cried together ; he got out of his chair and hugged Meg ; he got out of his chair and hugged Richard ; he got out of his chair and hugged them both at once ; he kept running up to Meg, and squeezing her fresh face between his hands and kissing it, going from her backwards not to lose sight of it, and running up again like a figure in a magic lantern ; and whatever he did he was constantly sitting himself down in his chair, and never stopping in it for one single moment ; being—that's the truth—beside himself with joy."

WHY THE LAST QUARTER OF THE CHIMES WAS A VERY MERRY ONE

And while the merry chimes were ringing little Lilian was awakened, and in came a number of Richard's chums with a drum and musical instruments to make merry for his approaching wedding on New Year's Day, and in came Mrs. Chickenstalker, who hadn't married grumpy old Tugby at all, and—just think of it—she was the very woman Will Fern was looking for, and her joy at finding little Lilian to adopt as her own child was so great that, for all her heavy weight, she got up and danced with the whole happy company to the awful music of the band.

So that the fourth quarter, at least, was a merry one, and the bells now chimed nothing but joy.

THE CRICKET ON THE HEARTH

A FAIRY TALE OF HOME

AT some time or another we may have heard the chirrup of the cricket. The merry "chirrup, chirrup," which this little insect makes from its snug corner near the kitchen hearth is a familiar sound to country folk, but it is seldom heard in the cities. In the story we are now to read the cricket plays an important part, and his chirps are heard throughout it. Indeed, the story is divided into three chirps, which you will agree is a change from the old-fashioned "chapters." Let us hear what "Chirp the First" has to tell us.

THE SINGING MATCH BETWEEN THE KETTLE AND THE CRICKET

The cricket is engaged in a lively competition with the kettle as to whose song will be the louder. And it is in every sense a pleasant place for such a competition, as the living-room of John Peerybingle's cottage is as cheery as a bright fire and a busy housewife can make it, and we know how cheery that is.

Peerybingle was a good-natured, lumbering sort of a countryman, over six foot tall, and none too gainly, but honest and warm-hearted. He was a carrier, and drove his horse and cart as regular as the clock along the country road, going to villages on the left of his house one day, and to the right the next. His wife, Mary, was just as bright and happy a little country lass as ever gladdened the home of an honest man. She was younger than John by some years, and very much smaller, so short, indeed, that John always spoke of her as "Dot." They had one child, just a baby in arms, and Tilly Slowboy, a clumsy country girl, was its nursemaid.

THE CARRIER HAS A WEDDING-CAKE FOR "GRUFF & TACKLETON"

There was yet another member of the carrier's family, whose name was Boxer, and him we must not forget, for, just as the cricket had reached the highest pitch of his chirruping, and the kettle had boiled over, Boxer, the dog, came barking at the door, a sign that his master was close at hand.

In a minute more, honest John was inside the room, receiving the heartiest of welcomes from his cheery wife and the chirping cricket. He had driven his cart through the most dismal winter weather, and there was not a more contented man in England that night than John Peerybingle when he sat down to his supper, which the busy hands of Dot had been in the act of preparing as Boxer came barking to the door. By the fireside Dot and John fell to talking of the cricket, and Dot said she loved the busy little creature because he had been chirruping at his merriest when, scarcely a year ago, John had brought her to the cottage as his wife.

They were both so fondly speaking of their love for each other that they forgot the basket of things John had brought in from the cart. But when they did remember it, Dot showed her cleverness by guessing that a round parcel it contained was nothing more or less than a wedding-cake, which John had collected at a baker's for delivering to a very ill-natured toymaker in the village, whose name was Tackleton, but who was called by the name of his firm, "Gruff and Tackleton," because of his unpleasant manner.

THE STRANGE OLD GENTLEMAN WHO WAS LEFT IN THE CARRIER'S CART

This discovery made Dot somewhat sad. She had been at school with May Fielding, the young woman whom Tackleton was known to be anxious to marry, and she had never dared to think that May could marry such a man. Yes; the thought of May having Tackleton for her husband made Dot sad; even the cricket was not singing so merrily now!

The carrier had forgotten something more, however, for he suddenly remembered that he had left an old gentleman in his cart! In another minute he was out at the stable yard with a lighted candle in his hand to see what had happened to his passenger. He found him still asleep, and, wakening him, brought him into the cottage.

"The Stranger, who had long white hair, good features, singularly bold and well defined for an old man, and dark, bright, penetrating eyes, looked round with a smile, and saluted the carrier's wife by gravely inclining his head.

"His garb was very quaint and odd—a long, long way behind the time. Its

hue was brown, all over. In his hand he held a great brown club or walking-stick; and, striking this upon the floor, it fell asunder and became a chair, on which he sat down, quite composedly.

"'There!' said the carrier, turning to his wife, 'that's the way I found him, sitting by the roadside! Upright as a milestone. And almost as deaf.'

"'Sitting in the open air, John?'

"'In the open air,' replied the carrier, 'just at dusk. "Carriage paid," he said; and gave me eighteenpence. Then he got in; and there he is.'

"'He's going, John, I think.'

"'Not at all; he was only going to speak.'

"'If you please, I was to be left till called for,' said the stranger mildly. 'Don't mind me.'

"With that, he took a pair of spectacles from one of his large pockets, and a book from another, and leisurely began to read, making no more of Boxer than if he had been a house lamb."



CALEB PLUMMER AND HIS DAUGHTER

Presently there was a knock at the door, and Dot thought it would be somebody calling to take away the old gentleman. But, no; it was only Caleb Plummer, the poor old toymaker who worked for "Gruff and Tackleton." He was a strange little figure, with his old, old face, not too well shaven, his bent old back and his coat of sacking, on which the letters G and T in large capitals, and also GLASS, were printed. The poor old fellow had made himself an overcoat out of some sacks that had contained glass for the toy factory! Caleb had called to see if John Peerybingle had anything for him, and the carrier happened to have two things.

THE BOX OF DOLLS' EYES FOR CALEB'S BLIND DAUGHTER

One was a very tiny flower-pot with a plant in it, and the other a small box of dolls' eyes. Both were for Caleb's daughter, Bertha—the flower-pot as a little present, and the glass eyes for her to fit into the dolls that Caleb made.

"To think that she should never see the dolls, and them a-staring at her so bold all day long!" said Caleb. "That's where it cuts"

For Bertha, his daughter, was blind, and all his thoughts were to make her as happy as he could. Caleb was about to go away with his little parcels, when he met another visitor at the door.

DOT, THE CARRIER'S WIFE, IS STARTLED BY THE MYSTERIOUS STRANGER

This was the impudent, unpopular Tackleton himself, Caleb's employer, who had called for his wedding-cake. The last sort of man to be concerned either with toys or with weddings. He hated toys, except that he could make money by selling them. He would rather have sold ugly ones than pretty ones. Not at all a pleasant sort of man, you will see. He talked about his marriage, rattled his money in his pocket, smiled with his half-shut eye—one was always open, and the other nearly shut—and, to the amazement of John and Dot, invited them to his wedding on the last day of January, urging them also to spend a social evening with him before that date. So he went on chatting, trying in vain to make himself agreeable, saying he hated crickets—for the cricket on the hearth was merrily chirruping again—and asking John if he was sure his wife was true to him. This, of course, was just the way to make John dislike him.

Presently, however, as the deaf old Stranger got up and walked to the fireside, Dot gave out a scream which agitated everybody and wakened Caleb, who had been dozing on the wedding-cake box! She said she had only had a sudden shock; but her eyes were still fixed upon the Stranger, and John didn't feel at all easy about his wife. He was mystified as to what had frightened her.

When all the callers had gone and a bed had been made for the Stranger, the carrier sat by the fire smoking his pipe, while Dot sat on a low stool by his side; and the cricket chirped so

merrily that John felt his doubts and fears at rest again. Yet, strange to say, Dot in her fancy saw a young man standing by the fireside, just as the old Stranger had stood when she had screamed; and this young man of her imagination was saying sadly, "Married, and not to me!" So "Chirp the First" ends and leaves us puzzled.

"GRUFF & TACKLETON" INVITES CALEB AND HIS DAUGHTER TO A PARTY

When "Chirp the Second" begins, we are at the home of Caleb Plummer, a poor, mean place, full of half-made toys and devoid of all comfort, where he and his blind daughter are at work. It was just a sort of shanty stuck on to the premises of Gruff and Tackleton. "You might have knocked it down with a hammer or two and carried off the pieces in a cart." Here, amidst a most extraordinary mixture of toys in all stages of making, Caleb sat talking to Bertha, while they both were busy with their work, Caleb putting the finishing touches to a doll's house and his daughter sewing on the dress of a doll.

Presently Caleb's employer, the unattractive Tackleton, came in and told them of his intended marriage, suggesting a party beforehand, at which he wanted Bertha and Caleb to be with the Peerybingles to meet his future wife and mother-in-law.

In due time the party was held, and Tackleton made vain efforts again to be agreeable. It was clear that nobody loved him, not even his intended bride, who had consented to marry him more for her mother's sake than his own.

WHAT BEWILDERED JOHN PEERYBINGLE AT TACKLETON'S TEA-PARTY

It was a memorable party to John Peerybingle, for the scheming Tackleton tried to unsettle the honest carrier by making him doubt his dear wife, Dot, by taking him to his office, where they could see her and the Stranger—no longer old and bent, but erect and tall, holding in his hand his false white beard—in close and earnest conversation in another part of the toymaker's premises. Poor John was bewildered, and when he drove his wife, with Tilly and the baby, and the false Stranger back in his cart, his heart was heavy indeed. And that is why "Chirp the Second" ends sadly.

John Peerybingle couldn't speak to his wife of what he had seen; he sat up all night in great agony of mind, for he hated to doubt his wife, and yet he felt she was keeping some secret from him. When he was at his gloomiest, the cricket began to chirp again, and, to his imagination, it seemed to become a fairy, who came and spoke to him and urged him to trust Dot with his very life. Indeed, the fairies played about him all night, and filled his thoughts with pleasant pictures of Dot to drive away the ugly ones.

When it was daylight, he went out to walk about, and soon met Tackleton, who was to be married that day. But, to cut a long story short, "Gruff and Tackleton" was not married at all, for there was no bride to meet him at the church! Yet his bride was married earlier than she had meant, and to another—the old Stranger, if you please. For he was none other than Caleb Plummer's son, who had been in a foreign country for many years, and had loved May Fielding before he went away.

DOT'S SECRET IS EXPLAINED AND THE CRICKET CHIRRUPS MERRILY AGAIN

Dear little Dot had discovered who the Stranger was through his disguise that night she screamed when he walked to the fireside, and she had been the means of May getting her first sweetheart for her husband—a far better arrangement, you will admit, than marrying old Tackleton. When John knew that was the reason of his wife being seen with the Stranger, he was delighted, you may be sure, and Tackleton's wedding-party became Edward Plummer's! But, after all, Tackleton turned out a brick, for he came to the party and admitted that he would have been a poor husband for May Fielding, saying, "Friends, one and all, my house is very lonely to-night. I've not so much as a cricket on my hearth. I have scared them all away. Be gracious to me; let me join this happy party!" This was at Peerybingle's house, and it was a very lively party indeed, for even blind Bertha, who had been told by May how poor old Caleb was, could now rejoice at the home-coming of her brother, who would put them out of want; and John Peerybingle, the carrier, nearly whisked Dot off her legs as they danced about the room, while the Cricket on the Hearth chirruped louder than ever!

THE NEXT STORIES OF FAMOUS BOOKS ARE ON PAGE 2457.

A FAMOUS POEM BY ROBERT BROWNING

IN the extremely spirited poem entitled "How They Brought the Good News from Ghent to Aix," the detail of which is so accurate, the whole picture so vivid, that we might easily imagine it to be the description of an actual episode in history, we see how the poet's imagination can create a living picture without the help of facts. For Robert Browning, in writing the poem, had no historical episode in mind, and really sought, by the art of verse, to suggest the rhythmic movement of a fine horse at a gallop. This he does to perfection, and even in this respect the poem is an effort of pure imagination, as the poet wrote it on a boat off the coast of Africa!

HOW THEY BROUGHT THE GOOD NEWS

CONTINUED FROM 2195

I SPRANG to the stirrup, and Joris, and he;
I galloped, Dirck galloped, we galloped all three.
"Good speed!" cried the watch, as the gate-bolts undrew;
"Speed!" echoed the wall to us galloping through.
Behind shut the postern, the lights sank to rest,
And into the midnight we galloped abreast.

Not a word to each other; we kept the great pace
Neck by neck, stride by stride, never changing our place; [tight,
I turned in my saddle and made its girths
Then shortened each stirrup, and set the pique right, [the bit,
Rebuckled the check-strap, chained slacker
Nor galloped less steadily Roland a whit.

'Twas moonset at starting; but, while we drew near [clear
Lokeren, the cocks crew and twilight dawned
At Boom a great yellow star came out to see;
At Duffeld, 'twas morning as plain as could be.
And from Mecheln church-steeple we heard the half-chime, [time!"
So Joris broke silence with: "Yet there is

At Aerschot, up leaped of a sudden the sun,
And against him the cattle stood black every one, [past;
To stare through the mist at us galloping
And I saw my stout galloper, Roland, at last,
With resolute shoulders each butting away
The haze, as some bluff river headland its spray.

And his low head and crest, just one sharp ear bent back
For my voice, and the other pricked out on his track; [glance
And one eye's black intelligence—ever that
O'er its white edge at me, his own master, askance! [aye and anon
And the thick, heavy spume-flakes which
His fierce lips shook upwards in galloping on.

By Hasselt, Dirck groaned; and cried Joris,
"Stay spur! [in her,
Your Roos galloped bravely, the fault's not

We'll remember at Aix"
—for one heard the quick wheeze
Of her chest, saw the stretched neck, and staggering knees,
And sunk tail, and horrible heave of the flank,
As down on her haunches she shuddered and sank.

So we were left galloping, Joris and I,
Past Loos and past Tongres, no cloud in the sky.
The broad sun above laughed a pitiless laugh,
'Neath our foot broke the brittle, bright stubble like chaff; [white,
Till over by Dalhem a dome-tower sprang
And "Gallop," cried Joris, "for Aix is in sight!"

"How they'll greet us!" and all in a moment his roan
Rolled neck and croup over, lay dead as a stone; [weight
And there was my Roland to bear the whole
Of the news which alone could save Aix from her fate,
With his nostrils like pits full of blood to the brim, [rim.
And with circles of red for his eye-sockets'

Then I cast my loose buff-coat, each holster let fall,
Shook off both my jack-boots, let go belt and all, [ear,
Stood up in the stirrup, leaned, patted his
Called my Roland his pet name, my horse without peer;
Clapped my hands, laughed and sang, any noise, bad or good, [stood.
Till at length into Aix Roland galloped and

And all I remember is friends flocking round
As I sate with his head 'twixt my knees on the ground,
And no voice but was praising this Roland of mine,
As I poured down his throat our last measure of wine,
Which (the burgesses voted by common consent)
Was no more than his due who brought good news from Ghent.

WARREN'S ADDRESS TO THE AMERICAN SOLDIERS

Was there ever a boy who did not thrill at "Warren's Address to the American Soldiers"? It was written by John Pierpont, and rings with the true American spirit.

STAND! The ground's your own, my braves!
Will ye give it up to slaves?
Will ye look for greener graves?
Hope ye mercy still?
What's the mercy despots feel?
Hear it in that battle-peal!
Read it on your bristling steel!
Ask it,—ye who will.

Fear ye foes who kill for hire?
Will ye to your homes retire?
Look behind you! they're afire!
And, before you, see
Who have done it! From the vale
On they come! And will ye quail?—
Leaden ram and iron hail
Let their welcome be!

In God of Battles trust!
Die we may,—and die we must;
But, O, where can dust to dust
Be consigned so well,
As where Heaven its dews shall shed
On the martyred patriot's bed,
And the rocks shall raise their head
Of his deeds to tell!

THE DESTRUCTION OF SENNACHERIB

Lord Byron wrote a number of beautiful poems, which he called "Hebrew Melodies," because he sought to express in them the feelings of the Hebrew people in their ancient days of struggle with the pagan nations around them. In this fine poem, which is one of the series, he describes with great power and imagination, and yet in plain, unaffected language, the defeat of Sennacherib, the great Assyrian king, who sought in vain to conquer the people of Israel.

THE Assyrian came down like the wolf on the fold,
And his cohorts were gleaming in purple and gold;
And the sheen of their spears was like stars on the sea,
When the blue wave rolls nightly on deep Galilee.

Like the leaves of the forest when summer is green
That host with their banners at sunset were seen:
Like the leaves of the forest when autumn hath blown,
That host on the morrow lay wither'd and strown!

For the Angel of Death spread his wings on the blast,
And breathed on the face of the foe as he pass'd,
And the eyes of the sleepers wax'd deadly and chill,
And their hearts but once heaved, and for ever grew still!

And there lay the steed with his nostril all wide,
But through it there roll'd not the breath of his pride;
And the foam of his gasping lay white on the turf,
And cold as the spray of the rock-beating surf.

And there lay the rider, distorted and pale,
With the dew on his brow, and the rust on his mail;
And the tents were all silent, the banners alone,
The lances unlifted, the trumpet unblown.

And the widows of Ashur are loud in their wail,
And the idols are broke in the temple of Baal;
And the might of the Gentile, unsmote by the sword,
Hath melted like snow in the glance of the Lord!

THE LEAVES AND THE WIND

"COME, little leaves," said the wind one day,
"Come o'er the meadows with me and play;
Put on your dresses of red and gold,
Summer is gone, and the days grow cold"

Soon as the leaves heard the wind's loud call,
Down they came fluttering, one and all;
Over the brown fields they danced and flew,
Singing the soft little songs that they knew

"Cricket, good-bye, we've been friends so long!
Little brook, sing us your farewell song!
Say you are sorry to see us go:
Ah! you will miss us, right well we know."

"Dear little lambs, in your fleecy fold,
Mother will keep you from harm and cold;
Fondly we've watched you in vale and glade;
Say, will you dream of our loving shade?"

Dancing and whirling, the little leaves went;
Winter had called them, and they were content
Soon fast asleep in their earthy beds,
The snow laid a coverlet over their heads

GEORGE COOPER.

SERENADE

This beautiful little "Serenade" was written by our well-loved poet, Henry Wadsworth Longfellow, and has been put to music.

STARS of the summer night!
Far in yon azure deeps,
Hide, hide your golden light!
She sleeps!
My lady sleeps!
Sleeps!

Moon of the summer night!
Far down yon western steeps,
Sink, sink in silver light!
She sleeps!
My lady sleeps!
Sleeps!

Wind of the summer night!
Where yonder woodbine creeps,
Fold, fold thy pinions light!
She sleeps!
My lady sleeps!
Sleeps!

Dreams of the summer night!
Tell her, her lover keeps
Watch! while in slumbers light
She sleeps!
My lady sleeps!
Sleeps!

SHERIDAN'S RIDE

This stirring poem by T. Buchanan Read, which describes an incident in the Civil War, takes us off our feet by its swing and gallop, and is a great favorite with many school children.

UP from the South at break of day,
Bringing to Winchester fresh dismay,
The affrighted air with a shudder bore,
Like a herald in haste, to the chieftain's door,
The terrible grumble, and rumble, and roar,
Telling the battle was on once more—
And Sheridan twenty miles away.
And wider still those billows of war
Thundered along the horizon's bar;
And louder yet into Winchester rolled
The roar of that red sea uncontrolled,
Making the blood of the listener cold,
As he thought of the stake in that fiery fray—
And Sheridan twenty miles away.

But there is a road from Winchester town,
A good, broad highway leading down;
And there, through the flush of the morning light,
A steed as black as the steeds of night
Was seen to pass as with eagle flight;
As if he knew the terrible need,
He stretched away with his utmost speed;
Hills rose and fell; but his heart was gay,
With Sheridan fifteen miles away.

Still spring from those swift hoofs, thundering South,
The dust, like smoke from the cannon's mouth,
Or the trail of a comet, sweeping faster and faster,
Foreboding to traitors the doom of disaster.
The heart of the steed and the heart of the master,
Were beating like prisoners assaulting their walls,
Impatient to be where the battlefield calls;
Every nerve of the charger was strained to full play,
With Sheridan only ten miles away.

Under his spurning feet the road,
Like an arrowy Alpine river flowed,
And the landscape sped away behind
Like an ocean flying before the wind,
And the steed, like a bark fed with furnace fire,
Swept on, with his wild eye full of fire.
But lo! He is nearing his heart's desire:
He is snuffing the smoke of the roaring fray,
With Sheridan only five miles away.

The first that the general saw were the groups
Of stragglers, and then the retreating troops.
What was done—what to do? A glance told him both.
Then, striking his spurs, with a terrible oath
He dashed down the line, 'mid a storm of huzzas,
And the wave of retreat checked its course there, because
The sight of the master compelled it to pause.
With foam and with dust the black charger was grey;
By the flash of his eye, and the red nostrils' play,
He seemed to the whole great army to say:
"I have brought you Sheridan all the way
From Winchester town to save the day."

Hurrah! hurrah for Sheridan!
Hurrah! hurrah for horse and man!
And when their statues are placed on high,
Under the dome of the Union sky,
The American soldiers' Temple of Fame,
There, with the glorious general's name,
Be it said, in letters both bold and bright:
"Here is the steed that saved the day,
By carrying Sheridan into the fight,
From Winchester, twenty miles away!"

THE DEATH OF NAPOLEON

WILD was the night, yet a wilder night
Hung around the soldier's pillow;
In his bosom there waged a fiercer fight
Than the fight on the wrathful billow.

A few fond mourners were kneeling by,
The few that his stern heart cherished;
They knew, by his glazed and unearthly eye,
That life had nearly perished.

They knew by his awful and kingly look,
By the order hastily spoken,
That he dreamed of days when the nations shook,
And the nations' hosts were broken.

He dreamed that the Frenchman's sword still slew,
And triumphed the Frenchman's eagle,
And the struggling Austrian fled anew
Like the hare before the beagle.

The bearded Russian he scourged again,
The Prussian's camp was routed,
And again on the hills of haughty Spain
His mighty armies shouted.

Over Egypt's sands, over Alpine snows,
At the pyramids, at the mountain,
Where the wave of the lordly Danube flows,
And by the Italian fountain,

On the snowy cliffs where mountain streams
Dash by the Switzer's dwelling,
He led again, in his dying dreams,
His hosts, the broad earth quelling.

Again Marengo's field was won,
And Jena's bloody battle;
Again the world was overrun,
Made pale at his cannon's rattle.

He died at the close of that darksome day,
A day that shall live in story;
In the rocky land they placed his clay,
"And left him alone with his glory."

—ISAAC MCLELLAN.

GROW old along with me!
The best is yet to be,
The last of life, for which the first was made:
Our times are in his hand
Who saith "A whole I plann'd.
Youth shows but half; trust God: see all nor be afraid!"

—ROBERT BROWNING.

LITTLE VERSES FOR VERY LITTLE PEOPLE

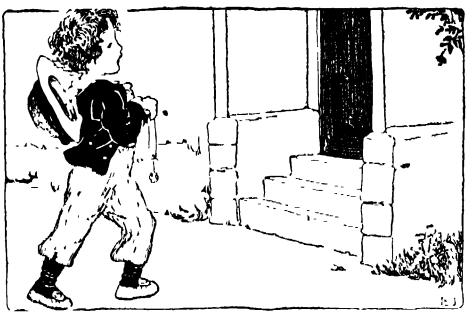
JIM and George were two great lords,
They fought all in a churn;
And when that Jim got George by the nose,
Then George began to grin.

ELIZABETH, Elspeth, Betsy, and Bess,
They all went together to seek a bird's nest,
They found a bird's nest with five eggs in,
They all took one, and left four in.



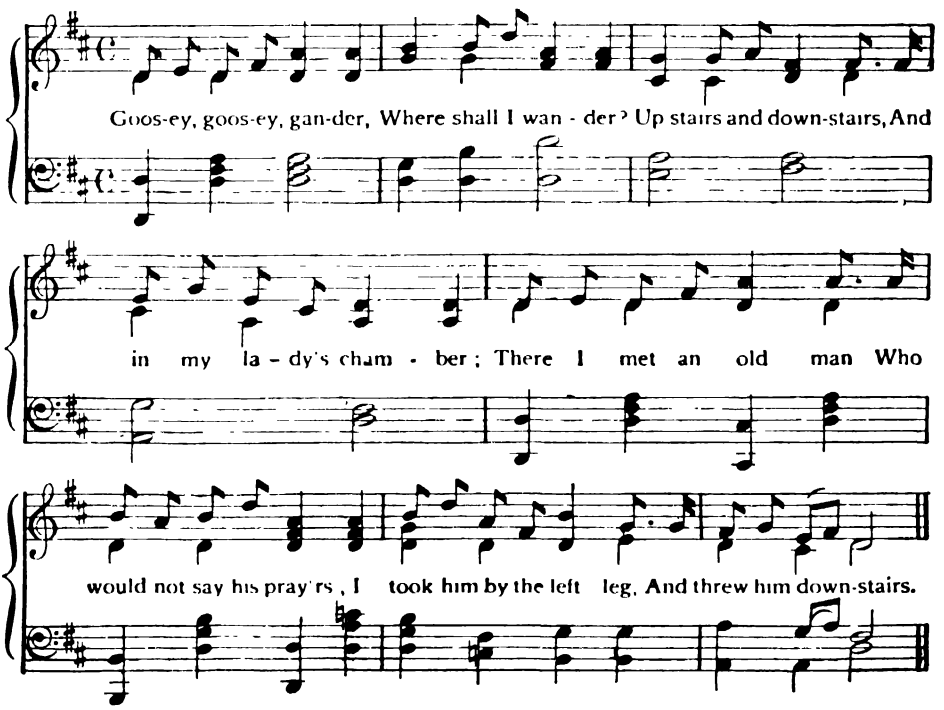
THE King of France, and four thousand men,
They drew their swords and put them up again.

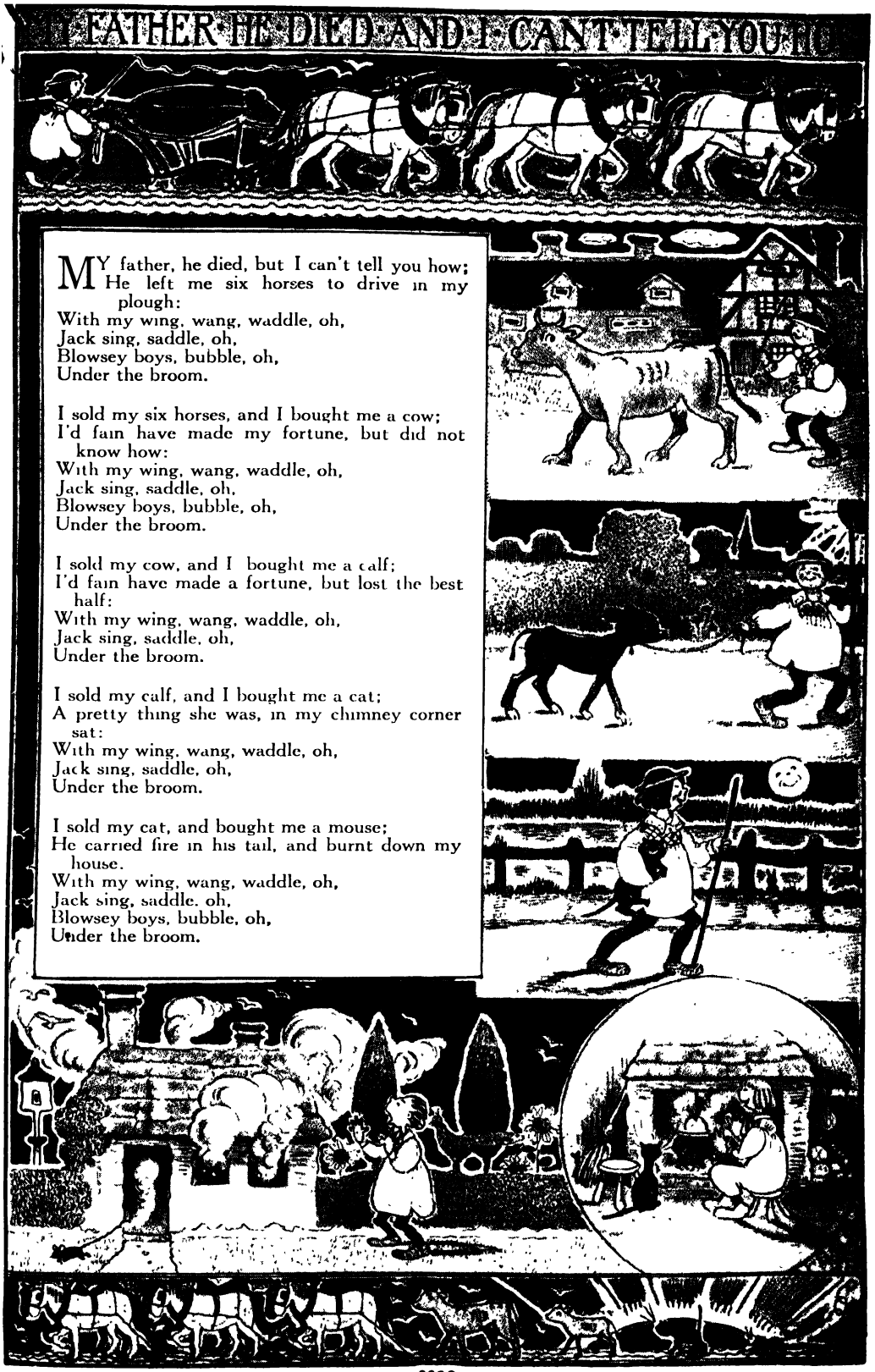
A DILLER, a dollar,
A ten o'clock scholar,
What makes you come so soon?
You used to come at ten o'clock,
But now you come at noon.



I HAD a little nut-tree, nothing would it bear
But a silver nutmeg and a golden pear.
The King of Spain's daughter came to visit me,
And all was because of my little nut-tree.
I skipped over water, I danced over sea,
And all the birds in the air couldn't catch me.

GOOSEY GOOSEY, GANDER





MY father, he died, but I can't tell you how;
He left me six horses to drive in my plough:
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.

I sold my six horses, and I bought me a cow;
I'd fain have made my fortune, but did not know how:
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.

I sold my cow, and I bought me a calf;
I'd fain have made a fortune, but lost the best half:
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Under the broom.

I sold my calf, and I bought me a cat;
A pretty thing she was, in my chimney corner sat:
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Under the broom.

I sold my cat, and bought me a mouse;
He carried fire in his tail, and burnt down my house.
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.

THE VOICE OF THE CUCKOO CAME FROM THE FIRE



The brothers, Scrub and Spare, were sitting before the fire, when suddenly from out the flames they heard the spring bird's voice saying "Cuckoo! cuckoo!" "It is something bad," said Scrub, very frightened.



THE COBBLERS & THE CUCKOO

A TALE FROM GRANNY'S WONDERFUL CHAIR

CONTINUED FROM 2180

ONCE upon a time there stood in the midst of a cold, bleak moor, in the far North Country, a certain village, all its inhabitants were poor, for their fields were barren, and they had little trade. But the poorest of them all were two brothers called Scrub and Spare, who followed the cobbler's craft, and had but one stall between them. It was a hut built of clay and wattles. There they worked in most brotherly friendship, though with little encouragement.

The people of that village were not extravagant in shoes, and better cobblers than Scrub and Spare might be found. Nevertheless, Scrub and Spare managed to live between their own trade, a small barley field, and a cottage garden, till one unlucky day when a new cobbler arrived in the village. He had lived in the capital city of the kingdom, and, by his own account, cobbled for the queen and the princesses. His awls were sharp, his lasts were new; he set up his stall in a neat cottage with two windows.

The villagers soon found out that one patch of his would outwear two of the brothers'. In short, all the mending left Scrub and Spare, and went to the new cobbler. So the brothers were poor that winter, and when Christmas came they had nothing to feast on but a barley loaf, a piece of musty bacon, and some small beer of their own brewing. They, however, made a great fire of logs, which crackled and blazed with red embers, and in high glee the cobblers sat down to their beer and bacon. The door was shut, for there was nothing but cold moonlight and snow outside; but the hut, strewn with fir boughs, and ornamented with holly, looked cheerful as the ruddy blaze flared up and rejoiced their hearts.

"Long life and good fortune to ourselves, brother!" said Spare. "I hope you will drink that toast, and may we never have a worse fire on Christmas but what is that?"

Spare set down the drinking-horn, and the brothers listened astonished, for out of the blazing root they heard "Cuckoo! cuckoo!" as plain as ever the spring bird's voice came over the moor on a May morning.

"It is something bad," said Scrub, terribly frightened.

"Maybe not," said Spare.

And out of the deep hole at the side which the fire had not reached flew a large grey cuckoo, and lit on the table before them. Much as the cobblers had been surprized, they were still more so when the bird began to speak.

"Good gentlemen," it said slowly, "can you tell me what season this is?"

"It's Christmas," answered Spare.

"Then a merry Christmas to you!" said the cuckoo. "I went to sleep in the hollow of that old root one evening last summer, and never woke till the heat of your fire made me think it was summer again, but now, since you have burned my lodging, let me stay in your hut till the spring comes round—I only want a hole to sleep in—and when I go on my travels next summer be assured that I will bring you some present for your trouble."

"Stay, and welcome," said Spare. "I'll make you a good warm hole in the thatch. But you must be hungry after that long sleep. Here is a slice of barley bread. Come, help us to keep Christmas!"

The cuckoo ate up the slice, drank water from the brown jug—for he would take no beer—and flew into a snug hole which Spare scooped for him in the thatch of the hut. So the snow melted, the heavy rains came, the cold grew less, the days lengthened, and one sunny morning the brothers were awakened



SCRUB AND FAIRFEATHER HAD A WEDDING FEAST, AT WHICH ALL THE VILLAGE DANCED

by the cuckoo shouting its own cry to let them know that at last the spring had come.

"Now," said the bird, "I am going on my travels over the world to tell men of the spring. There is no country where trees bud or flowers bloom that I will not cry in before the year goes round. Give me another slice of barley bread to keep me on my journey, and tell me what present I shall bring you at the end of the twelve months."

"Good Master Cuckoo," said Scrub, "a diamond or pearl would help such poor men as my brother and I to provide something better than barley bread for your next entertainment."

"I know nothing of diamonds or pearls," said the cuckoo; "they are in the hearts of rocks and the sands of rivers. My knowledge is only of that which grows on the earth. But there are two trees hard by the well that lies at the world's end. One of them is called the golden tree, for its leaves are all of beaten gold. As for the other, it is always green, like a laurel. Some call it the wise, and some the merry tree. Its leaves never fall, but they that get one of them keep a blithe heart in spite of all misfortunes, and can make themselves as merry in a poor hut as in a handsome palace."

"Good Master Cuckoo, bring me a leaf off that tree!" cried Spare.

"Now, brother, don't be foolish!" said Scrub. "Think of the leaves of beaten gold! Dear Master Cuckoo, bring me one of them."

Before another word could be spoken the cuckoo had flown.

The brothers were poorer than ever that year; nobody would send them a single shoe to mend. The new cobbler said, in scorn, they should come to be his apprentices; and Scrub and Spare would have left the village but for their barley field, their cabbage garden, and a maid called Fairfeather, whom both the cobblers had courted for more than seven years.

At the end of the winter Scrub and Spare had grown so poor and ragged that Fairfeather thought them beneath her notice. Old neighbors forgot to invite them to wedding feasts or merry-makings; and they thought the cuckoo had forgotten them too, when at daybreak, on the first of April, they heard a hard beak knocking at their door, and a voice crying:

"Cuckoo! cuckoo! Let me in."

Spare ran to open the door, and in came the cuckoo, carrying on one side of his bill a golden leaf, larger than that of any tree in the North Country; and in the other, one like that of the common laurel, only it had a fresher green.

"Here!" it said, giving the gold to Scrub and the green to Spare.

So much gold had never been in the cobbler's hands before, and he could not help exulting over his brother.

"See the wisdom of my choice," he said, holding up the large leaf of gold. "As for yours, as good might be plucked from any hedge. I wonder a sensible bird should carry the like so far."

"Good Master Cobbler," cried the cuckoo, finishing the slice, "your conclusions are more hasty than courteous. If your brother be disappointed this time, I go on the same journey every year, and, for your hospitable entertainment, will think it no trouble to bring each of you whichever leaf you desire."

"Darling cuckoo," cried Scrub, "bring me a golden one."

And Spare, looking up from the green leaf on which he gazed, said:

"Be sure to bring me one from the merry tree."

And away flew the cuckoo once again.

Scrub vowed that his brother was not fit to live with a respectable man; and taking his lasts, his awls, and his golden leaf, he left the wattle hut, and went to tell the villagers.

They were astonished at the folly of Spare, and charmed with Scrub's good sense, particularly when he showed them the golden leaf, and told them that the cuckoo would bring him one every spring. The new cobbler immediately took him into partnership; the greatest people sent him their shoes to mend; Fairfeather smiled graciously upon him, and in the course of that summer they were married, with a grand wedding feast, at which the whole village danced, except Spare, who was not invited.

As for Scrub, he established himself with Fairfeather in a cottage close by that of the new cobbler, and quite as fine. There he mended shoes to everybody's satisfaction, had a scarlet coat for holidays, and a fat goose for dinner

every wedding-day anniversary. Spare lived on in the old hut and worked in the cabbage garden. Every day his coat grew more ragged, and the hut more weather-beaten; but people remarked that he never looked sad or sour; and the wonder was that, from the time they began to keep his company, the tinker grew kinder to the poor ass with which he traveled the country, the beggar-boy kept out of mischief, and the old woman was never cross to her cat or angry with the children.

I know not how many years passed in this manner, when a certain great lord, who owned that village, came to the neighborhood. His castle was ancient and strong, with high towers and a deep moat. All the country, as far as one could see from the highest turret, belonged to this lord; but he had not been there for twenty years, and would not have come then, only he was melancholy.

The cause of his grief and sorrow was that he had been Prime Minister at court, and in high favor, till somebody told the Crown Prince that he had spoken disrespectfully concerning the turning out of his Royal Highness's toes, whereon the North Country lord was turned out of office, and banished to his own estate. There he lived for some weeks in very bad temper; but one day in the harvest time his lordship chanced to meet Spare gathering watercresses at a meadow stream, and fell into talk.

How it was nobody could tell, but from the hour of that discourse the great lord cast away his melancholy, and went about with a noble train, making merry in his hall, where all travelers were entertained and all the poor were welcome.

This strange story soon spread through the North Country, and a great company came to the cobbler's hut—rich men who had lost their money, poor men who had lost their friends, beauties who had grown old, wits who had gone out of fashion—all came to talk with Spare, and, whatever their troubles, all went home merry. The rich gave him presents, the poor gave him thanks.

By this time his fame had reached the court. There were a great many discontented people there besides the King, who had lately fallen into ill-humor because a neighboring princess, with seven islands for her dowry, would not marry his eldest son. So a royal messenger was sent to Spare, with a command that he should go to court.

"To-morrow is the first of April," said Spare, "and I will go with you two hours after sunrise."

The messenger lodged all night at the castle, and the cuckoo came at sunrise with the merry leaf.

"Court is a fine place," he said, when the cobbler told him he was going; "but I cannot go there—they would lay snares and catch me. So be careful of the leaves I have brought you, and give me a farewell slice of barley bread."

Spare was sorry to part with the cuckoo, but he gave him a thick slice, and, having sewed up the leaves in the lining of his leather doublet, he set out with the messenger on his way to the royal court.

His coming caused great surprize; but scarce had his Majesty conversed with him half an hour when the princess and her seven islands were forgotten, and orders given that a feast for all comers should be spread in the banquet hall. The princes of the blood, the great lords and ladies, Ministers of State, and judges of the land, after that discoursed with Spare, and the more they talked the lighter grew their hearts, so that such changes had never been seen.

As for Spare, he had a chamber assigned him in the palace, and a seat at the King's table; one sent him rich robes and another costly jewels; but in the midst of all his grandeur he still wore the leathern doublet, which the palace servants thought remarkably mean. One day the King's attention being drawn to it by the chief page, his Majesty inquired why Spare didn't give it to a beggar. But the cobbler said:

"High and mighty monarch, this doublet was with me before silk and velvet came—I find it easier to wear than the court cut; moreover, it serves to keep me humble, by recalling the days when it was my holiday garment."

The King thought this a wise speech, and commanded that no one should find fault with the leathern doublet. So things went, and Spare prospered at court until the day when he lost his doublet, of which we read in that part of this book beginning on page 2398.

STORIES OF GREECE AND ROME

THERE are many stories of ancient Greece and Rome that will be told over and over again so long as mankind loves to listen to the telling of tales. These stories are sometimes true, or historical, and sometimes imaginary, or legendary; but, whether truth or fable, they are always full of interest and charm. We shall read both kinds of tales from time to time, and we cannot fail to profit by them, for they always teach as well as entertain, which all good stories should do.

THE FOOLISH EMPEROR & HIS FOWLS

IN old days, the most important person in the world was the Roman Emperor. There are plenty of kings and emperors nowadays, and there is plenty for them to do in making good laws, and seeing that people keep them.

But the Roman Emperor used to be more important, because he had to look after everyone in his empire, which was a very big one indeed. But once there was an emperor whose name was Honorius, and that was just at a time when the whole empire was in very great danger.

But Honorius paid no heed to that; the only things he thought really interesting were cocks and hens and chickens! So when his Ministers or great officers of the court or the army came to him to ask what they were to do, he would say: "Go away and wait. Can't you see that I have to feed my chickens?"

Nobody was sorry when the Emperor died and was no longer the most important person in the world.

THE TALE OF THE DUTIFUL SONS

IN the ancient city of Argos there abode with their mother two young men whose names were Cleobis and Bito, who were famous through the land for their skill in all manly sports.

Now, there was a festival in honor of the greatest of the goddesses, Hera, the wife of Zeus, and it behoved the mother of those twain that she should be drawn in a chariot to the temple of the goddess.

But when there was tarrying of the oxen which were to have drawn the chariot after the Greek manner, her two sons made haste and yoked themselves to the car, and drew it to the temple, which was many miles away, and all men's mouths were full of the praises of the young men.

Then was their mother's heart filled with joy, and she prayed to the goddess saying: "Queen of gods and men, grant to my two noble sons the greatest blessing thou canst bestow on mortal man."

But when the festival was finished, Cleobis and Bito lay down in the temple to sleep, and behold, in the morning the spirits had departed out of their bodies, and this was accounted the answer of the goddess to the prayer of their mother; because to mortals the gods can grant no greater boon than to take them to dwell with the immortals.

THE SACRIFICE OF MARCUS CURTIUS

ONCE on a time in ancient Rome it befell that many troubles came upon the state, and men said that the gods must be wroth; but when one day there was a terrible noise of grinding and roaring and a great chasm opened in the ground, they were sure of it.

Therefore they consulted an oracle, to learn how the anger of the gods might be appeased, and the oracle made answer: "When Rome's greatest treasure is cast into the chasm, it will be closed again, for a sign that the gods are angry no more." But none could tell what the greatest treasure was, so there was great lamentation.

Then a young and valiant soldier, whose name was Marcus Curtius, said: "Surely Rome has no greater treasure than the lives of the citizens who are willing to die for their country!" So he arrayed himself in his armor, and mounted his war-horse, and leaped into the chasm, and then the chasm closed, and was henceforth called Lake Curtius, for Rome could make no greater sacrifice than the willing death of her noblest son.

A WARNING TO DANCERS

THERE was a certain rich man called Clisthenes who had a fair daughter, and from all Greece came wooers, among whom Hippoclides found favour.

Then Clisthenes gave a great feast to all the suitors, declaring that thereafter he would make known which of them he had chosen for his daughter. But when they waxed merry with feasting, Hippoclides began to dance, and when he leaped on a table and began to walk on his hands, Clisthenes cried out: "Have a care Hippoclides! You are dancing away your marriage." But "What cares Hippoclides?" quoth he, upside down, with wagging legs. So Hippoclides was sent packing, and another suitor won the coveted prize.

THE WISEST MAID IN WESSEX

IN the ancient days there was a King of Wessex whose name was Ina. He was a tall, brave, handsome man, but he had a great failing. The least thing irritated him and threw him into a sudden fit of wild anger. Knowing this, he resolved to marry a wise maiden who could restrain him and govern him. One afternoon he rode out from Winchester into the great forest, and, feeling thirsty, he stopped at a woodman's hut to get a drink of milk. The woodman's pretty daughter Edith brought him some milk, and when he gave her back the mug he said:

"I am King Ina of Wessex. Empty all the seas of the world with this mug, and I will make you my Queen."

Edith went into the hut, and brought out a handful of tow, and gave it to King Ina, saying merrily:

"Stop up with this tow all the rivers, and I will do as you wish."

"You are the girl I've been looking for," said King Ina.

And he set her upon his horse, and led her to his palace at Winchester. But just before they were married Edith said to him:

"You know you have a very hasty temper. So promise that if you are ever angry with me and send me out of the palace you will let me take a parting gift away with me."

King Ina, of course, agreed to this. As they were sitting at supper one night, Ina was offended by some good advice which his wife gave him, and he cried:

"You interfere too much in my affairs. To-morrow you go back with your father to the hut."

When her husband's back was turned, she put a drug into the mead he was drinking, and this made him fall into a deep sleep, and then she had him carried softly to the hut in the forest.

"Who brought me here?" he shouted, on awakening the next morning.

"I did, dearest," said Queen Edith. "You are my parting gift."

"Ah!" said King Ina, kissing her. "I did well in marrying the prettiest maid in Wessex, and also the wisest!"

THE FAIRY MAID OF VAN LAKE

A SHEPHERD lad from Mothvey was tending his sheep one afternoon beside Van Lake, in the Black Mountains of Wales, when three fairy maids came out of the water and began to play on the grass. All were beautiful with a beauty never seen on a mortal face, but the youngest was the loveliest; and the shepherd fell in love with her, and won her as his bride. On the wedding-day the fairy came out of Van Lake, and brought, as a dowry, three cows, two oxen, and a bull, and the marriage was joyfully celebrated at Mothvey Church.

"Now mind," said the fairy maid to her husband, "if ever you strike me three times without cause, I shall have to return to Van Lake."

The shepherd said he would never dream of touching her, and they lived happily together, and three little boys were born to them. But when he asked his wife to go for a horse for them to ride to the christening, she quite forgot to do so, and, without thinking about her threat, he slapped her on the shoulder, telling her to do as she had been bidden.

"That's one," said the fairy.

Soon afterwards they went to a wedding, and instead of merrymaking the fairy cried all the time, just as though she were at a funeral and everybody was sad.

"Why do you cry?" said the shepherd, slapping her on the shoulder.

"Because the marriage will prove unhappy," she replied. "And mind! You have now struck me twice."

The shepherd became very careful, for he certainly was very anxious not to lose his wife, but later, at a funeral, his wife shocked everybody by laughing and dancing. Quite forgetting himself, the shepherd tapped her, saying:

"Is this a time for rejoicing?"

"Yes," said the fairy. "The baby has escaped the sorrows of earth and entered the Kingdom of Heaven. But that's the third blow. Farewell!"

As she entered Van Lake her cattle followed her. When her three sons grew up, however, the fairy maid appeared again, and gave them the gift of healing, and they all became famous physicians.

THE FABLES OF ÆSOP THE SLAVE

THE FARMER AND HIS SONS

AN old farmer lay very ill, and it was soon seen that he was going to die. So he called his two sons, and said:

"My boys, all the fortune that I have to leave you is my farm and fields, which I give to you in equal shares; but you are on no account to let the ground pass out of your own occupation, for whatever treasure I have besides lies buried somewhere in the ground within a foot or two of the surface."

The two sons thought that their father was talking about some money that he had buried; so after his death they set to work and carefully dug every



inch of the ground. They found no buried treasure, but the result of their digging was that the ground was so well stirred and turned over that it produced splendid crops, and the two sons were well repaid for their trouble.

The way to get rich is to work hard.

THE FOX AND THE MASK

A FOX was walking along one day when, by the roadside, he found a mask, carved in the shape of a man's face. He picked it up and looked at it



carefully, then he turned it over and found that it was hollow inside. The fox then laughed, and said: "What a pity it is that such a wise-looking head should have no brains inside it!"

Good looks are worth nothing without good sense.

THE BOYS AND THE FROGS

A PARTY of mischievous boys were playing in a field near a pond. When they got tired of running about, they gathered at the side of the pond



and amused themselves by throwing stones at the unfortunate frogs as often as they showed their heads above water.

At last an old frog put his head out, and said: "Boys, you don't seem to remember that, though this may be play to you, it is death to us."

Never play games which are cruel.

THE WOLF IN SHEEP'S CLOTHING

A WOLF one day dressed himself in the skin of a sheep, and so was able to creep in among the flock and kill and eat a great many of them.

One day the shepherd found him out, and, tying a rope about his neck, hung



him to the branch of a tree by the roadside. Some other shepherds passing by asked the man what he meant by hanging one of his sheep; but when he showed them that it was really a wolf dressed up as a sheep, they all agreed that the animal deserved his fate.

Hypocrites always get found out.

A BOX OF GOOD LUCK

A GENTLEMAN in France was walking one day through the streets when he saw a pretty little "twist" in a baker's shop-window.

"That is the very thing to tempt my poor little girl," he said, and went into the shop to buy the pretty bread for his invalid child.

While he was waiting for his change, a little mite of a boy, six or seven years of age, very poor, but neatly dressed, entered the shop.

"Madame," he said to the baker's wife, "mamma has sent me here to fetch a loaf."

"Have you any money?" she said, with a smile, placing an immense loaf in the little arms.

"No, madame; but mamma says she will come and speak to you to-morrow."

"All right; run away with your loaf."

"Thank you, madame," said the child.

The gentleman received his change, and was just about to leave the shop when he discovered the little boy still standing behind him.

"Hallo!" said the baker's wife, "are you still there? What is the matter? Doesn't the loaf suit you?"

"Oh, yes!" replied the boy.

"Then carry it to your mother," said the woman. "If you are late, she will scold you for loitering."

The child did not seem to hear. Something held him spellbound. The baker's wife went up to him and tapped his cheek.

"Come, what are you dreaming about?"

"Madame," said the child, "who is it that sings here?"

"No one."

"Yes; listen!"

The baker's wife and the gentleman both listened, but could hear no singing, only the chirping of the crickets, which are found in French bakeries.

"It is a little bird," whispered the boy; "or perhaps the bread sings in the oven, like the apples."

The baker's wife laughed.

"That is nothing but the crickets, my little man."

"Crickets!" cried the boy. "Are they really crickets?" He blushed suddenly scarlet. "Oh, madame," he said eagerly, "I should be so happy if you would only give me a cricket!"

"Why, what do you want with a cricket? I should be glad if I could give you all I have in the house."

"Oh, madame, only one, if you will!" said the child, putting his hands together above his loaf. "Someone told me crickets bring good luck to houses; perhaps if we had one at home, my poor mamma, who is so sad and ill, would never cry any more."

The gentleman looked at the baker's wife. She was wiping a tear away.

"And why does your mother cry, little man?" he asked gently.

"It is the bills," answered the child. "My daddie is dead, and my mother has to work hard because of these bills."

The gentleman took the little boy in his arms and kissed him. The woman went to the bakery; she was afraid to touch the crickets herself, but she got her husband to catch four and put them in a box with holes in the lid for them to breathe through; then she brought the box to the child, who received it with a kind of joyful awe. He went out like someone in a dream.

When he was gone, "Poor little chap," said the gentleman and the woman together. She went to her desk, opened the book at the page where the widow's account for bread was written, and, drawing a pen through it, wrote at the bottom "Paid."

The gentleman took out all his silver, and, giving it to the baker's wife, said: "Will you place this money in the receipted bill and send it to the poor widow, with a note saying that one day her child will certainly grow up to be a joy to her and a help?"

This was done. A long-legged baker's boy set off at a good trot, and arrived at the sad and humble home long before the little mite with his big loaf and his box of crickets.

When the child did arrive, he found his mother (for the first time since his father's death) joyous and gay. Immediately he thought to himself: "It is the crickets."

And it is really quite certain that but for those crickets and his own good heart this happy change of fortune would never have taken place.

RAPUNZEL'S GOLDEN LADDER

A YOUNG Prince was hunting one day in a forest in Germany, when he heard a girl singing sweetly and sadly to herself. He followed the sound, and came to a tower in which there was no door or stairs. As he stood among the trees, wondering where the entrance was, a Witch hobbled up and sang:

"Rapunzel! Rapunzel!
Let down your hair."

A lovely maiden at once came to the window at the top of the tower, and unbound her golden tresses, and they were so long that they touched the ground, and the Witch slowly climbed up them.

"Ah," said the Prince, "I will use that golden ladder!"

When the Witch departed, he also sang:

"Rapunzel! Rapunzel!
Let down your hair."

Rapunzel did so, and he ascended. But oh, how startled she was when he appeared! She had never seen a man before. The Witch had taken her from her parents when she was a baby, and put her in the tower, and there she had grown up all alone. The Prince talked to her so lovingly that her heart was soon won, and she promised to marry him.

"Now, my dearest," said the Prince, when it grew dark, "I must find a silken ladder by which you may escape. I will bring it to-morrow when the Witch has gone away."

Unhappily, Rapunzel was very simple-minded. When the Witch came and climbed up her hair, she said:

"How long you take, granny! The Prince climbs up in an instant."

"What!" said the Witch, raging with anger. "After all the trouble I have taken to keep you separate from the world, you let down your hair for a man to climb up! You must die!"

Seizing a pair of scissors, she cut off Rapunzel's hair, and led her into a desert, and left her there to perish. The Witch then returned to the tower, and climbed up by means of the golden tresses, which she had tied round the window-bar.



"Ah," said the Prince, "I will use that golden ladder!"

"Rapunzel! Rapunzel!
Let down your hair,"

sang the Prince, as he came through the forest, carrying a silken ladder. Then, seeing the tresses, he gaily climbed up, and entered the room

"Ah, ah!" shrieked the Witch, as she saw him looking around for Rapunzel. "The pretty little bird isn't in the nest. The cat has killed it, and the cat is going to scratch your eyes out."

She pushed the Prince, and he tumbled out of the window, and fell on a bush, and the thorns pierced his eyes. After wandering blindly about the forest, he came to the desert, and heard Rapunzel singing sweetly and softly to herself.

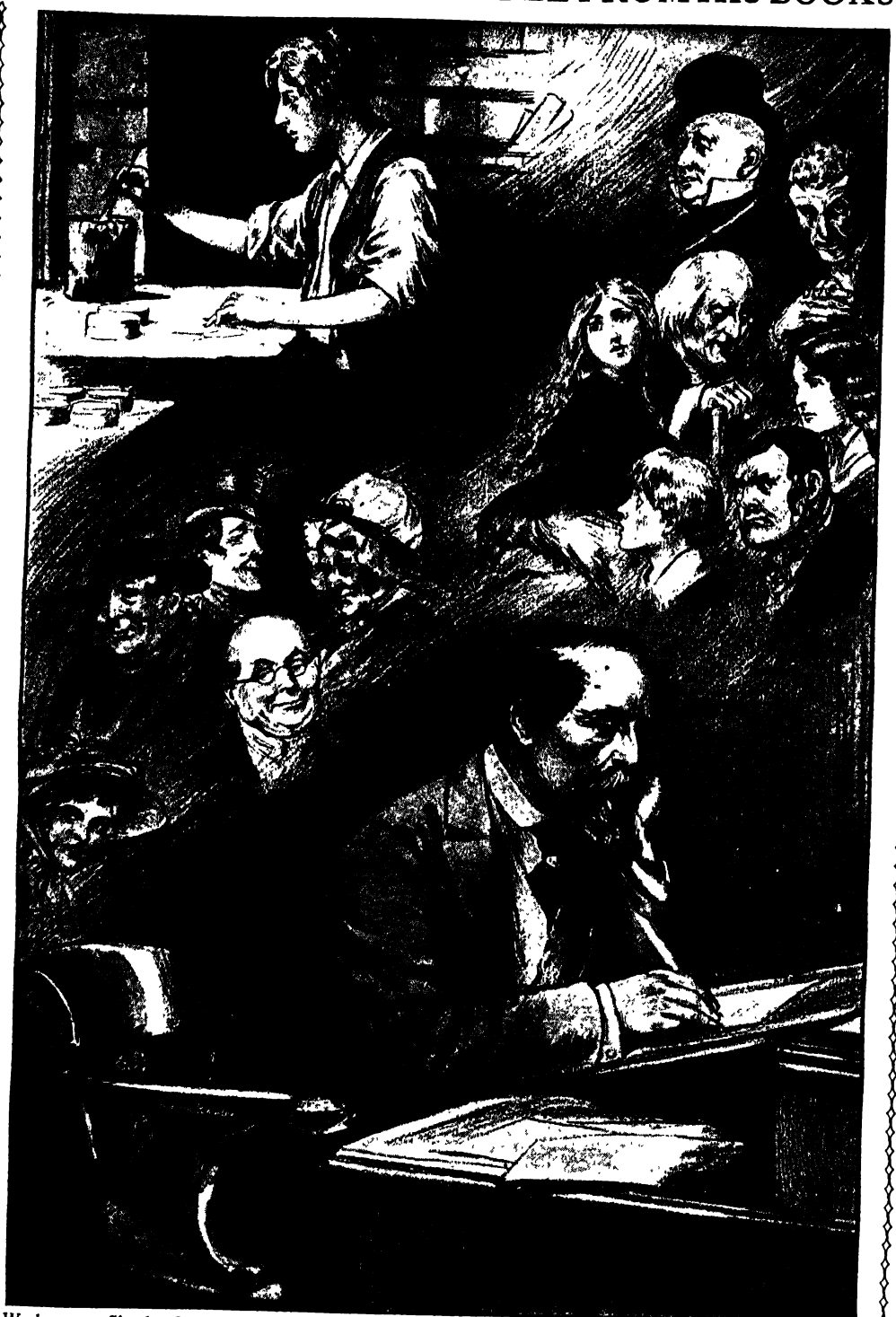
He followed the sound, and she saw him, and ran up and fell upon his neck weeping, and two of her tears wetted his eyes, and he recovered his sight.

The bad old Witch, who had been watching from the top of the tower, saw the lovers meet, and she was so angry at their happiness that her rage choked her, and she died.

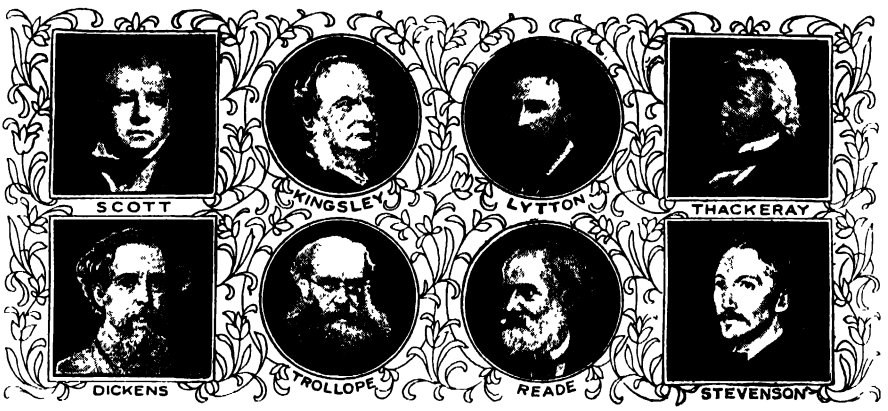
The Prince at once led Rapunzel to his father's kingdom, and there they were joyfully married in great splendor.

THE NEXT STORIES BEGIN ON PAGE 2395

DICKENS AND SOME PEOPLE FROM HIS BOOKS



We here see Charles Dickens as a boy, pasting labels on blacking-boxes, and later as the world-famous novelist he became. In the background we have a glimpse of some of the characters he described in his stories. Just above his chair peeps Dolly Varden, and Pickwick, old Mr. Weller and Sam, his son, and Mrs. Gamp are all near by. Then there is Grip, the raven, with Oliver Twist and Bill Sikes, Florence Dombey, and Little Nell and her grandfather. The man in the hat is Mr. Micawber, and at his side is Uriah Heep.



THE GREAT STORY-TELLERS

FAMOUS BRITISH WRITERS OF THE LAST CENTURY

CONTINUED FROM 2169



THE last of the famous story-tellers about whom we read on page 1752 was Oliver Goldsmith, whose death occurred in the year 1774. Three years before that time a boy was born in Edinburgh who was to become the greatest of all our story-tellers. His name was Walter Scott, and his birthday was August 15, 1771. Though born in the eighteenth century, we do not consider Walter Scott as a novelist of that century, for he was only twenty-nine years of age when the nineteenth century began, and he had not yet written any of his famous stories.

It was, indeed, a remarkable, and in some respects a heroic, life that began that August day in one of the narrow streets of old Edinburgh, where the father of the new baby, who was fated to make his name illustrious, was a well-known member of the legal profession. This little Walter Scott, although an uncommonly healthy child, found his troubles begin soon enough, for when he was only some eighteen months old he lost the power of his right leg, and many years were to be spent by his anxious parents in trying everything that could be done to restore the use of his limb. Success attended their efforts in the end, and, although Walter was doomed to go lame through life, as he grew into lusty boyhood the use of his leg came back to him so well that he could even join with his playmates in the dangerous sport of climbing up the famous Castle Hill that stands proudly in the midst of his native town.

When he was eight years old, young Walter was sent to the High School, and from all accounts he did nothing to distinguish himself there, nor did he do much better at the University. His schoolmasters had very little hope that their lame pupil would ever make himself famous; but they were merely reckoning without the important knowledge that Walter was a genius, and therefore not to be judged by the rules by which ordinary people may be judged. But if Walter Scott learned little Latin and less Greek at the High School and at the University of Edinburgh, he had learned many things that were to prove even more useful to him in after life. His appetite for reading could never be satisfied, and he himself has told us that probably no boy of his age had read so much, but chiefly of the old legends and romances, as his imagination from the first was most keenly interested in everything of a romantic nature.

He had a friend who was also of like mind, and the two used to compose romances for each other's amusement, rehearsing their juvenile compositions aloud as they wandered among the solitary places of Arthur's Seat and Salisbury Crags, those picturesque hills that tower beyond historic Holyrood.

THE LAME SCHOOLBOY AND THE ROMANTIC TOWN IN WHICH HE LIVED

Edinburgh in those days was just the place to kindle the imagination of a romantic boy, who would find at almost every turn among its grey and narrow streets, with their tall and sombre buildings, landmarks of Scotland's thrilling history, many of which, in the great changes of the nineteenth century, have disappeared.

If Walter Scott was not a brilliant schoolboy nor a successful student, that must have been because his mind was roving in the fairy realms of old romance and history, for when the time came to open the gates into other realms of fancy, which could only be done by the key of foreign languages, he applied himself so well that he speedily learnt French and Italian, in order to read the romances written in these tongues. For poetry he had also a passion as a boy, and long legends in verse he could read with as keen a relish as a boy of to-day will read a stirring detective story.

When he was about fourteen years of age, Walter Scott entered his father's office, and seven years later he was qualified as an advocate, but he did not possess those powers of oratory which are necessary for success in that branch of the profession. He was only twenty-five when his first literary work appeared, a book of ballads adapted from a German author.

HOW WALTER SCOTT BEGAN BY GATHERING OLD POEMS FOR HIS BOOKS

He was already at work, whenever he could get the opportunity, gathering legends and ballads among the old-fashioned folk of the Scottish borderland, from which part of the country his ancestors had come. And in the year 1802 the results of these gatherings of song and legend were seen when the first volume of his famous "Border Minstrelsy" was published.

Three years later his own original poem, "The Lay of the Last Minstrel," made his name famous throughout the land. It was thus, as a teller of stories



SIR WALTER SCOTT FINDING THE LOST STORY THAT MADE HIM FAMOUS

THE AUTHOR OF "WAVERLEY" AT HIS OWN FIRESIDE



This picture, by Sir William Allan, shows Sir Walter Scott reading a proclamation of Mary Queen of Scots.

in verse, that Walter Scott first made his mark, and his next great work, "Marmion," was also a long and stirring poem. Many stories are told of his wonderful power to work in later years, but there surely never was a busier author than he even in those earlier years of which we are speaking, when he was not only writing the poems we have named, and, above all, "The Lady of the Lake," which appeared in 1810, but was editing the works of many earlier authors, writing their biographies, discharging an important legal office, starting the famous "Quarterly Review," engaging in farming, and beginning the construction of the fine mansion house of Abbotsford. The lame boy, you see, had proved a very giant of a man, and yet he had not set his hand to his greatest work. He had already tried his hand at a long story of Scottish life and character dealing with the generation before his own—that is to say, the lifetime of his father—but the manuscript of this story he had mislaid. But, rummaging one day in the drawer of an old writing-table, Scott came upon the missing manuscript, and, sitting down to read it over again, decided to give it some finishing touches and send it to his publisher. The story which had thus been nearly lost was none other than the famous "Waverley."

"Waverley" was published without the name of the author, and, as it im-

mediately became a popular book, Scott next addressed himself to the writing of the celebrated series known as the Waverley Novels. These wonderful stories, so fresh and vigorous in style and so thrilling in the splendid union of adventure and romance, fascinated the public of his time, and perhaps made his name the more famous because it was at first withheld.

HOW SIR WALTER SCOTT HAD TO FACE DEBTS AMOUNTING TO $650,000

From the sales of his books he earned very large sums of money, far more, and deservedly so, than any author of our time has ever earned, but he unfortunately became a partner in the firm that published his books, and that firm, being stupidly conducted, failed, involving Scott in the general ruin. This happened in the year 1826, only a few months before the death of his wife, who was the daughter of a French aristocrat driven from France to Great Britain during the Revolution.

Sir Walter—for he had been created a baronet in the year 1820—now set himself to the hardest task a great author has ever had to face: no less than to earn by his pen so vast a sum as $650,000, in order to pay the creditors of the publishing firm the money due to them, though he had been in no way responsible for the waste of their money.

Every moment of his time that could be given to his desk he spent there, writing—writing night and day, often with a sad heart and in ill-health, spinning his stories of olden times, perhaps not so brilliantly as he had done before, but writing also many essays, and a "Life of Napoleon."

THE HAND AT THE WINDOW, AND HOW IT SWEPT THE DEBT AWAY

There is a famous story told of Scott in his Edinburgh days. A gentleman who lived opposite his house could see at the novelist's study window a hand regularly placing a newly-finished sheet of writing on the growing heap at the side of a desk. Day after day the unwearied hand was seen; it was Sir Walter's at work on his novels. Long afterwards, at Abbotsford, the same tireless hand was at work, and every time it put down another sheet a little bit of that great pile of debt had been swept away, and so, with the heart of a hero, Scott continued his work for six more years before death overtook him, on September 21, 1832. If he had not succeeded in paying all the money he had undertaken to pay, the work he had done in those six years yielded sufficient after his death to clear off every penny of his debts.

The next great story-teller does not resemble Sir Walter Scott in personal character, although his name is no unworthy one to place alongside of Sir Walter's as a novelist. Lord Lytton, while falling short of Sir Walter Scott in some respects, was a more varied genius, and, indeed, no other literary man of the nineteenth century achieved anything like his success in so many different ways. He could write fine historical novels, such as "The Last Days of Pompeii," and many other kinds of novels as well; he wrote fine plays, such as "The Lady of Lyons," and others which are still performed; while he was also a poet, though not a great one, a brilliant essayist, and a fine orator, gaining some eminence as a statesman and receiving a peerage as a reward for his political services.

LITTLE STORY-LIVES OF LORD LYTTON AND WILLIAM MAKEPEACE THACKERAY

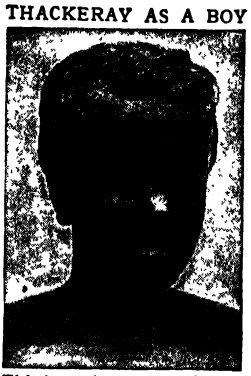
All this will tell you at a glance what a remarkable man he must have been, matching even Sir Walter in his wonderful capacity for work. Before he was made a peer his name was Edward Bulwer-Lytton, and he was born in London, on May 25, 1803. His parents were people of wealth and distinction, so that in early life he had every advantage, but did not greatly distinguish himself at Cambridge, except in winning a gold medal for poetry.

As a little child he had loved to read all sorts of tales of romance, and began writing verse at a tender age, although in after life he won greater distinction in prose than in poetry. It is doubtful whether he was altogether a likeable boy. We know he was no favorite of his father's but that may have been because he was his mother's darling; and at least one of his schoolmasters, Dr. Hooker, of Rottendean, seems to have been glad to get rid of him, while recognizing that he was no ordinary boy. Dr. Hooker wrote to Bulwer's mother: "Your son has exhausted all I can profess to teach him. His energy is extraordinary. He has a vital power which demands a large field. He has it in him to become a very remarkable man."

These were very true words, and were justified in every particular. When Bulwer, against the advice of all his friends, and in opposition to his mother's wish, married a beautiful but unsettled Irish girl, he took a step which was most disastrous, and few marriages of literary men have been less happy than his.

But his unfortunate marriage had at least one good result, as his mother cut down his allowance to a mere $1,000 a year, while he preferred to live at the rate of $150,000. Thus, in order to secure the necessary money, he took to writing books, and speedily became the most notable literary man of his time, never sparing himself in the work that he had taken up as much out of love for the art as need for the money which it earned him, for in later years, when he did not require to make money by his pen, he remained as thorough and excessively painstaking in everything he did. This great author died at Torquay, on January 18, 1873, and was buried in Westminster Abbey.

THACKERAY AS A BOY



This bust shows very plainly his broken nose, the result of a blow from a school bully.

The next two famous story-tellers whose names attract our attention were born within a few months of each other, and we seldom think of the time in which they lived without having both their names in our mind, although there was no great resemblance either between the men or their works. Thackeray and Dickens are to-day the best-remembered novelists of what is termed the Victorian period, their work having been done chiefly under the reign of Queen Victoria, although both of them had begun to write before the death of William IV. William Makepeace Thackeray was born on July 18, 1811, at Calcutta, where his parents and his grandparents before them had lived as officials of the old East India Company, which conducted the affairs of India before it was taken over by the Imperial Government. Then, as now, the children of English people in India were sent home to England, when they became of school age, to be educated in the Old Country. Thackeray's father died when the boy was only five years old, and his mother, who was noted for her beauty, afterwards married again. He was eleven when he was sent to England, and became a scholar at the famous Charterhouse School, in London.

Many great men had been scholars there before him, and as Thackeray was an easy-going, good-natured, and rather dreamy boy, he was probably given to fancying himself as treading in their footsteps instead of applying himself diligently to his studies. Certainly he did not prove a brilliant scholar during the six years he spent there, but he had a great natural gift for writing comic verses and drawing comic sketches, so that he would doubtless prove an entertaining companion to many of the boys by making fun of their teachers—a habit schoolboys have had since schools began. Being inclined to indolence rather than to exertion, he made no figure in the sports of the school, but the broken nose, which is seen in all his portraits, proves that he had at least the pluck to face an opponent, for this was the result of an encounter he had with a fighting scholar when he was only a little boy.

THACKERAY WITH HIS MOTHER AND FATHER



We give this interesting picture of Thackeray as a child with his parents by permission of Messrs. Smith, Elder & Co., who were his publishers. His daughter, Lady Ritchie, now possesses the original painting.

Thackeray did not shine at the University, and he spent only two years at Cambridge, not staying to take his degree; but it was during this time that he made his first appearance in print by writing a very amusing burlesque of the poem with which Alfred Tennyson had just won the prize at the same university. Thackeray had begun to study for the law; but, after leaving the University and spending some time abroad, he decided to become an author, as money could be earned that way more readily than in law, and he had great need of money, which he spent quickly.

THACKERAY IN LATER LIFE



From a sketch by Sir John E. Millais.

Perhaps he would rather have been an artist, and he did study art for a time in Paris; but, although he used his pencil a great deal in after life, and many of his sketches are very amusing, he was never more than an amateur draughtsman. He even applied for the work of illustrating "Pickwick," the famous novel of Charles Dickens, but he could not have done the work so well as the artist to whom it was given.

What fortune Thackeray inherited he managed to lose by taking part in starting newspapers which were failures, and so he was in a manner forced to write for a living. Nor had he any difficulty in getting work to do, as everything he wrote was humorous and full of character. He was twenty-five years of age when he married, and settled in London, but some four years after his marriage the mind of his wife gave way, and all the rest of his life was clouded with this unhappiness, so that when we read his amusing stories we may sometimes think that, though he makes us laugh, his own heart was sad at the time he wrote them. The most famous of the many stories written by Thackeray is "Vanity Fair," which is certainly one of the greatest English novels; but perhaps there is no finer historical story than "Esmond," which he wrote when he was forty years of age. Many of his lighter sketches, in which he pokes fun at all sorts of people of his time, appeared in the great comic paper, "Punch," to which he contributed for many years, and perhaps he wrote so many short pieces because to the end of his days he was rather inclined to procrastinate, putting off his work to the last moment, so that the writing of a long story was a very real task to him; yet none could excel him in the art when he gave his mind to it.

This great writer and very lovable man died suddenly on the morning of Christmas Eve, 1863, and was buried at Kensal Green. A memorial bust was soon afterwards erected to him in Westminster Abbey.

The early days of Charles Dickens were far from being happy, although both his parents were alive to look after him. That is exactly what neither of them did, and although Thackeray had lost his father, and left his mother in India, his boyhood was no doubt happier than that of young Dickens.

Charles Dickens was born at Portsea, on February 7, 1812. His father was a good-natured, lazy man, and his mother a well-educated but not a very warm-hearted woman. Little Charles was taught to read by his mother, but he attended a school at Chatham, where they lived for a time; and the great delight of his early boyhood was the reading of a little library of stories which he discovered in an upstairs room of his father's house. It is said that he would go about for a whole week together imagining himself to be the hero of some of these romances.

His father got into debt; the family moved to a miserable house in Camden Town, London. Charles who longed to

go to school, was turned into a little household drudge, and his parents seemed to forget about his education entirely.

Later on his father was imprisoned for debt, the bailiffs took away all their furniture, leaving only the beds and some pots and pans, and, worst of all, they took away the story-books which had given so much delight to Charles.

In those days a man who was imprisoned for debt could have his family to live with him in the prison, where a fair amount of liberty was allowed. And so Dickens's mother, with her other children, went to stay at the prison with his father, while he was sent out to work at the distasteful task of sticking labels on blacking-bottles, whereby he could earn a dollar or so a week. At length his father got a legacy of a few hundred dollars, was able to leave his prison, and the family took up house again in Camden Town.

AFTER MUCH MISERY DICKENS ENJOYS HAPPY SCHOOLDAYS IN LONDON

When Charles was twelve years of age he was taken away from his dirty work of label-pasting, and sent to a school in Hampstead Road where the teachers seem to have been the queerest sort of people imaginable. But Dickens was happier now than he had ever been; he could indulge in his taste for reading.

For the first time in his life he had chums at school, and as he also loved to imagine himself an actor, he invented what he called a "lingo," which merely consisted in adding a few letters of the same sound to the end of every word, and, talking this aloud, he and his playmates delighted to walk about the streets pretending to be "foreigners."

Charles Dickens was fourteen when he left school and entered a solicitor's office; but on his father becoming a reporter on one of the London papers, the young Charles determined also to be a reporter. So he taught himself shorthand, and by spending much of his time at the British Museum managed to make up for the shortcomings in his education. He was nineteen years old when he became a reporter. While he was working for his newspaper he began writing sketches of the characters he had observed; and in the year 1836 these were collected into a book under the title of "Sketches by Boz," as "Boz" was the name with which he had signed them on their first appearance. He received $750 for this book from the publisher, and when he became famous afterwards he had to pay $8,250 to buy the copyright back from the publishers of the book.

HOW CHARLES DICKENS CAME TO BE LOVED BY HOSTS OF READERS

"The Pickwick Papers" were written a year after "Sketches by Boz," and became so popular that the author was presently the happiest and most successful story-teller in England. To the end of his days he kept the love of the multitude of readers which his stories won to him. He was a true child of genius, and all the hardships of his early life, which brought him into contact with all sorts of people of the lower class, who are always far more interesting than the well-to-do people, he turned into use by weaving them into his stories. His great novel, "David Copperfield," contains much that is true of his own life; and even to-day Charles Dickens remains one of our best-loved story-tellers, though he died suddenly in the full tide of his splendid literary power on June 9, 1870, at Gads Hill, a fine house near Rochester, which, as a poor boy, he had longed to possess, and had been able to purchase when he became a successful and world-famous author.

CHARLES READE, WHO WROTE "THE CLOISTER AND THE HEARTH"

A story-writer who was extremely popular in his own day, but cannot be said to have been quite so great as any of those we have mentioned, was Charles Reade. He wrote at least one historical story, which is only second-rate because it has to be compared with the wonderful stories of Sir Walter Scott and Thackeray's splendid "Esmond." This is "The Cloister and the Hearth." Its author was in many ways a very remarkable man. He was born on June 8, 1814, of well-to-do parents.

His early schooldays are said to have been chiefly noted for the amount of flogging he had to suffer, as those were the days when teachers believed more in thrashing their pupils than in making knowledge attractive to them. But he had also private tutors, and later gained some distinction at Oxford University, becoming a barrister in his twenty-ninth

year. A curious fact about Charles Reade is that he is one of the few famous authors who did not begin to write early in life, as he was thirty-six before he seriously attempted the art of authorship, and he was forty-seven when his best story was written.

People who knew him seem to have liked Charles Reade because he was really a very warm-hearted friend of the poor and oppressed, and some of his stories, which were most popular in his own day, were written for the purpose of drawing attention to public evils which he wished to see abolished. He died on April 11, 1884, and was buried in Willesden churchyard.

Anthony Trollope, who was born less than a year after Reade, on April 24, 1815, was the most distinguished member of a literary family. His mother and his elder brother were also well-known authors of their day, though their works are now forgotten.

ANTHONY TROLLOPE, THE MAN WHO COULD WRITE STORIES IN THE TRAIN

Anthony Trollope's own stories are not so often read as they deserve to be. His life is not a very interesting one to write about, as it lacks the ups and downs of fortune which make the lives of many literary men so full of interest.

Trollope was educated at Winchester and Harrow, and became an official of the Post Office, in which service he continued for more than a quarter of a century. His duties took him into many different parts of the country, and sometimes abroad; but he was so methodical a man that he allowed nothing to interfere with the writing of his stories, and resolutely set himself to produce so many pages every day, even if he had to write them in a train. Great literature cannot be created in this fashion, and though method is a good thing in a book-keeper or a carpenter, it is not so in an author who wishes to give to the world the best thoughts he can think and the finest story he can tell, as these come to him only at irregular times.

It is surprising indeed that Trollope wrote so well as he did under the circumstances, for in such novels as "Barchester Towers," "The Three Clerks," "Framley Parsonage," and others that might be mentioned, he gives us really spirited descriptions of the life of his time, which will always be interesting on account of their truth and their correct observation of manners and customs that are now passing away. He died in London, on December 6, 1882.

CHARLES KINGSLEY, A REAL HERO WHO WROTE OF HEROES

A very different type of man, and one whose name must always be remembered with admiration, was Charles Kingsley, the writer of that stirring tale of romance and adventure, "Westward Ho!" He was a very gifted man in many different ways, a true Christian gentleman, a valiant fighter for truth, a distinguished scholar, and the writer of fine, vigorous stories which, in their manly tone and simple, direct manner of telling, resemble the author himself.

The son of a Devonshire clergyman, Kingsley was born on June 12, 1819; and after distinguishing himself at Cambridge University he became rector of Eversley, in Hampshire, in 1844, where the remaining thirty-one years of his busy and useful life were spent. It would be difficult here to explain the great part played by Kingsley in awakening and directing the public mind of his time in all that concerned the religious and social well-being of his beloved England—for in Kingsley we see a fine example of the true-hearted Englishman, and it was in two of his novels, the first that he wrote, "Alton Locke" and "Yeast," that he did immense good in this direction. Such stories as these prove that the art of fiction can do far more in touching the thoughts of the general public than even serious lectures or sermons can do.

KINGSLEY AS A GREAT STORY-TELLER AND SOMETHING BETTER

"Westward Ho," of course, has no such purpose, and perhaps simply because it is a fascinating tale of adventure on the Spanish main in the great days of Queen Elizabeth it is likely to live the longest of all the books he wrote. Kingsley was also a fine poet, but, above all, he was a noble, pure-hearted, and Christ-like man, which, after all, is something better than being even a great story-teller.

He died on January 23, 1875, two years after he had been appointed Canon of Westminster. He was also Chaplain to Queen Victoria. His brother, Henry

Kingsley, who died in 1876, was also a brilliant novelist, and his story of "Ravenshoe" is as good as anything of Charles Kinsgley's.

Of course, there are other well-known story-tellers of the nineteenth century whose lives would be interesting to know; but it is impossible here to tell of even the two most famous—George Meredith and Thomas Hardy—and we can only mention another, whose life was in many ways the most interesting of them all.

ANOTHER EDINBURGH BOY WHO BECAME A GREAT STORY-TELLER

Robert Louis Stevenson was born in Edinburgh, on November 13, 1850, and his father, his grandfather, and his uncle were all celebrated builders of lighthouses. Stevenson was very proud of his ancestors, as he might well be, for it is surely a fine work to set up these wonderful towers along the coasts to light the sailors safely home to port through the dark night. It is very likely that the romance connected with the building of these mighty beacons of the sea had much to do in kindling the love of romance in Stevenson himself, which was to result in his writing some of the finest romantic stories published in the latter half of the last century.

Stevenson was a weak and ailing child, and had his parents not been well supplied with money so that they were able to give him the greatest care, taking him to healthful places and constantly watching over him, he might never have grown to manhood. Though feeble in body he was always strong in mind and brave of heart, and he could show when the time came that he could not only write of brave deeds, but that he could do them also.

ROBERT LOUIS STEVENSON AS AN AUTHOR AT SIXTEEN

He resembles Sir Walter Scott in doing nothing of note either at school or university; but while he seemed to be wasting his time he was in reality preparing himself for the work of his life by reading widely all the books we do not get at school and imitating the styles of different authors, until he had formed for himself a manner of expressing his thoughts or telling his tale which is far more charming than that of any other author of his time. He was only sixteen years of age when he wrote a description of a historical event in Scotland, "The Pentland Rising," and this was published as a little booklet.

His first real books were little stories of travel on the Continent, but it was with that most delightful tale of adventure, "Treasure Island," that his name first became popular. He next wrote "Kidnapped," a story that will long be the delight of old and young alike; and he was a charming poet, too, for no one has excelled him in expressing in verse the delights of childhood, as he has done in his famous book, "A Child's Garden of Verses."

Ill-health pursued Stevenson all his days, and it is wonderful to think that he was able during his short life, and racked by illness so often, to write so many fine stories, essays, and poems that a complete edition of his works requires no less than twenty-eight volumes, and every page he wrote has a charm all his own, for he never shirked a single sentence.

HOW THE WRITER OF "KIDNAPPED" WAS BURIED ON A SOUTH SEA ISLAND

When he was thirty-nine years of age, he could no longer fight against the severe winters of his native land, and, with his wife and two stepchildren, he built himself a strange house far away in the Pacific Ocean, on the lovely island of Samoa. There for a few years he lived and worked surrounded by native servants, the friend of Samoan chiefs, who loved him as a brother. When he died suddenly, on December 3, 1894, they cut a way through the thick bush and reverently carried his coffin to the top of the beautiful mountain he had loved to look upon from his Samoan home. And there he lies under a tomb on which these verses, written by himself, are engraved:

Under the wide and starry sky,
Dig the grave and let me lie.
Glad did I live and gladly die,
And I lay me down with a will.

This be the verse you grave for me:
"Here he lies where he longed to be;
Home is the sailor, home from the sea,
And the hunter home from the hill."

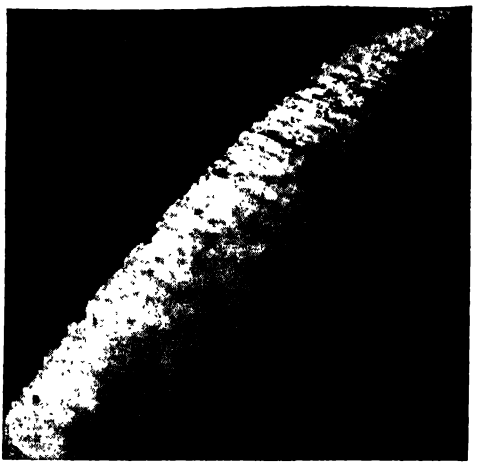
After his death the chiefs forbade the use of guns near the mountain-top where his body rests, so that "the birds may live there undisturbed and raise above his grave the songs he loved so well."

THE NEXT STORIES OF MEN AND WOMEN ARE ON PAGE 2434.

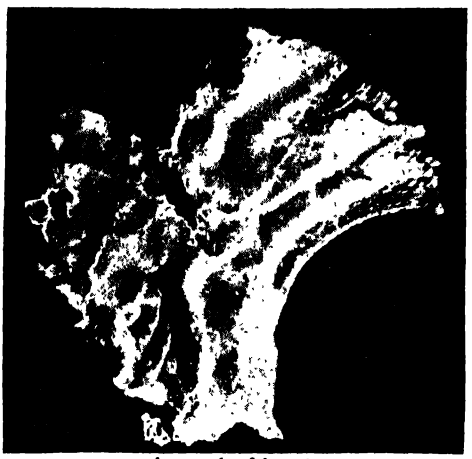
THINGS THAT ARE NOT WHAT THEY SEEM



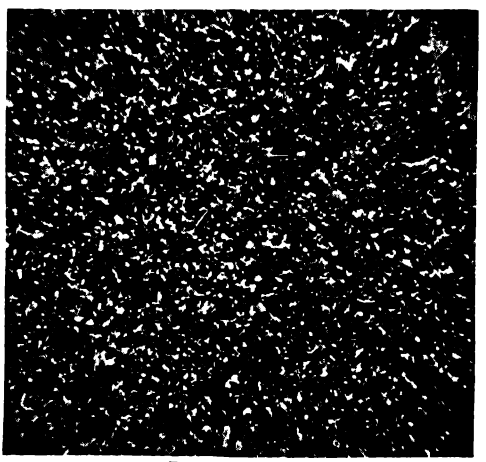
The sharp edge of a razor.



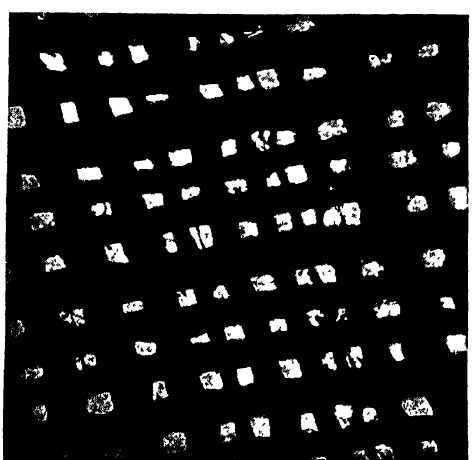
A knife-edge, looking like a mountain.



A crumb of bread.



Dust on a shelf.



A fine linen handkerchief.



The crystals in a pinch of salt.

Look back at the wasp's sting and compare it with the edge of a razor. The sting looks smooth and perfect, when magnified, but the razor, the finest thing the cutler can make, looks jagged and blunt. How much better is Nature's work than man's! The handkerchief looks like sacking full of holes, but not black as here.



THE STORY OF THE MICROSCOPE

CONTINUED FROM 2260

HALF the wonders of the world are never seen by human beings. We learn very slowly. It took us millions of years to find out about steam and electricity. The use of gas for lighting was not discovered until years and years after men had seen that it would burn and light dark places. Radium, and the wonderful Röntgen rays which enable us to photograph the inside of the body, were only discovered in the last decade of the last century. Not until Galileo turned his telescope up to the stars had men really seen the heavens and their marvels.

Wonderful as is the telescope, the microscope is to most of us more wonderful still. It does not make distant objects seem near. The object to be examined has to be placed quite close to the glass of the microscope, but it makes those objects seem so large that there are few secrets of Nature which we cannot examine.

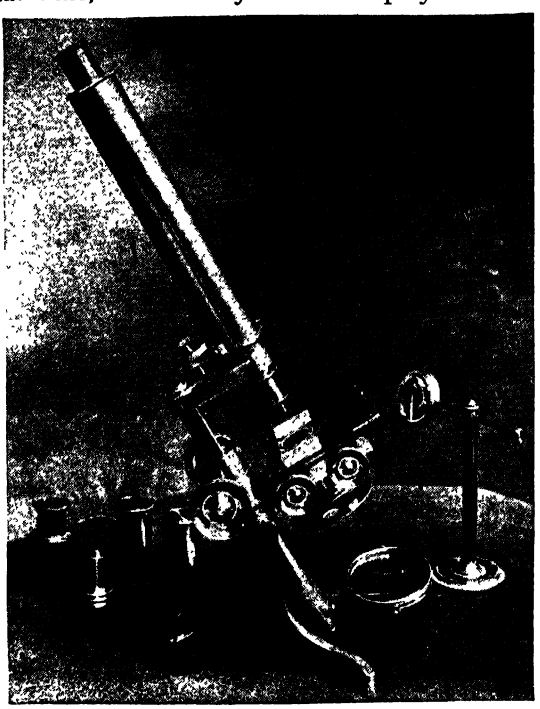
For thousands of years men were on the way towards making the grand discovery of the microscope, but they stopped short of full success. When Sir Henry Layard was digging in the rubbish which covered the great palace in which Nimrod once lived, he found, in the ruins, a lens of rock crystal—that is, a lens of natural glass—which had been used as a magnifying glass when Nimrod lived, thousands of years ago.

How could they have discovered the use of the magnifying glass all those ages ago? Probably it was because they learned that if a tiny object, placed on a flat surface, were covered by a drop of clear water, the little object would be made to appear large. They would not understand that a transparent object which has its surface arched outward, like an egg, alters the direction of the rays of light traveling through it. This alteration of the direction of the rays is called refraction. The effect of this is to gather together the rays of light coming from all quarters, to focus them on the object under the lens, and to make that object appear as a very large, clear picture to the eye. The ancients perhaps found that glass, shaped like a drop of water, would do the same thing.

At different times in history other men made just the same sort of discovery. Men made magnifying glasses by melting many threads of glass together into bubbles, and by blowing glass balls and filling them with water. Polished gems also were used for this purpose. The word *lens* tells us what men thought of the things they used. They called the glass a lens because it reminded them of the shape of a lentil seed. Spectacles are one of the forms of these glasses for making things appear

larger and nearer. Those have been in use about six hundred years.

One of the first men who really studied microscopes was Anton van Leeuwenhoek, a poor Dutch clerk, who was born in 1632 and lived till 1723. He ground and polished lenses which magnified things he looked at. His work was very important. In 1628 Harvey had given the world his explanation of the circulation of the blood in our bodies. That was the greatest discovery ever made by a surgeon up to that time, but scarcely anybody knew what it meant, and many people did not believe it. But Leeuwenhoek, with his microscope, was able to examine the blood in the veins and actually to see it flowing along. He also described accurately the red corpuscles of the blood. Harvey would have given all he possessed to see that sight, but he was in his grave before Leeuwenhoek made his microscope. Although Leeuwenhoek did so much wonderful work, he could not go beyond the powers of the microscope he made. It remained for other men, like Dr. Wollaston and Sir David Brewster, to make big improvements. They had great trouble with the lenses, so much so that Brewster said that we should have to use diamonds for the lenses. What was sought in the way of improvement was to increase the power of the microscope to magnify and to make the object examined clear and sharp as well as large, and with its colors preserved, not all jumbled together.



THE MICROSCOPE

Placing the object on the plate or shelf of the microscope, we look at it through the tube, which has the lens at the top, and a smaller glass, like a big diamond, at the bottom. The round glass under the plate reflects light through the plate. The glass like a bull's eye reflects light from the gas or lamp.

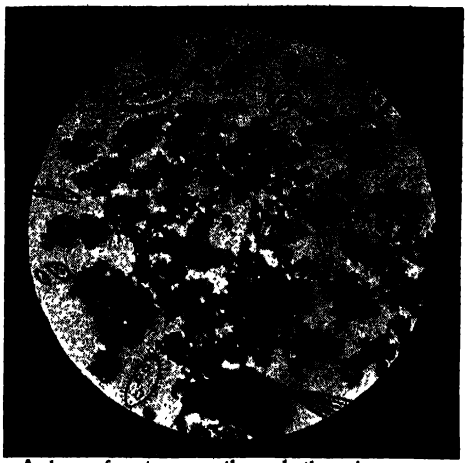
Many men have helped to do this. Two of the most famous are Giovanni Battesta Amici, an Italian astronomer, and the father of Lord Lister, Joseph Jackson Lister. The last named suffered from short sight in one eye. Now, when he sat at the window looking through an air-bubble formed in the glass, he saw that the bubble made the things beyond the window clear to his short-sighted eye. This set him thinking about the use of lenses for the eyes. But he had to work hard, and it was not until 1824, when he was nearly forty years old, that he had time to experiment with the microscope.

He employed a man to make lenses for him, but soon Lister had to take up the work himself and to make his own. He discovered that previous ways of making and arranging the lenses had been wrong. He made new lenses and arranged them in a different way. Many improvements have been made since then, but he paved the way to make the microscope the thing of wonder that it is to-day.

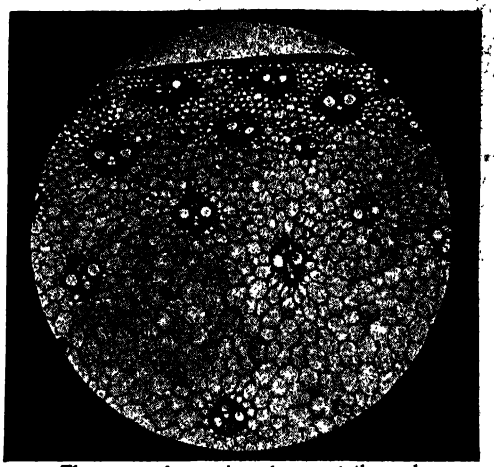
By its aid we can see a world of living things in a drop of pond water; we can make a grain of sand look like a great crystal with the light shining through it. We can see living animals in the human blood fighting out their battles before our eyes. We can see a tiny piece of rose petal becoming a marvelous web of silver cells, all filled with fluid; we can see a claw like the claw of a lion on the foot of a caterpillar.

The microscope reveals to us wonders that Shakespeare never saw; marvels that the greatest kings of the past could not have seen, had they offered their crowns to see them. The pictures in these pages show us some familiar things as seen through the microscope.

FAMILIAR THINGS UNDER THE MICROSCOPE



A drop of water seen through the microscope



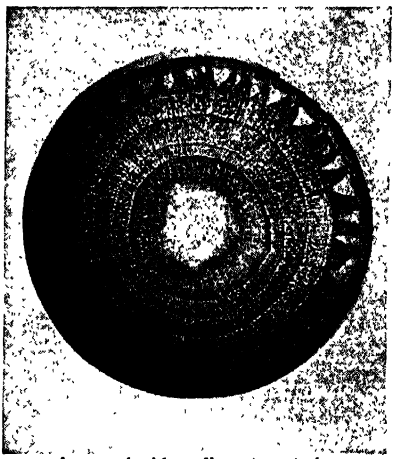
The stem of a maize plant cut through



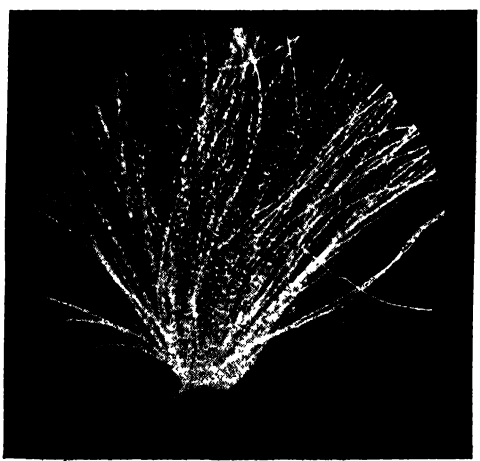
A section cut through a fern



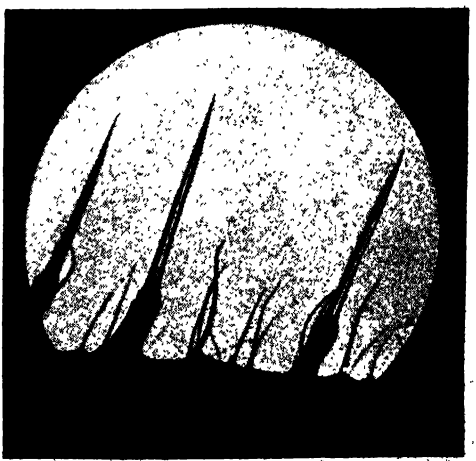
A white daisy petal



A peep inside a lime-tree twig



Thistle-down



The stings of a nettle

The tiny drop of water here is magnified to 100 times the size which it seems to our eyes. It is pond water and is full of living things, swimming, eating, and drinking before our eyes. No wonder the nettle hurts when it has such stings! How beautiful is the inside of the lime twig when magnified, like some fine mosaic.

WASPS, BEETLES, SPIDERS, AND LADYBIRDS



The strong leg and claw of a water-beetle



The keen spear with which a wasp stings us



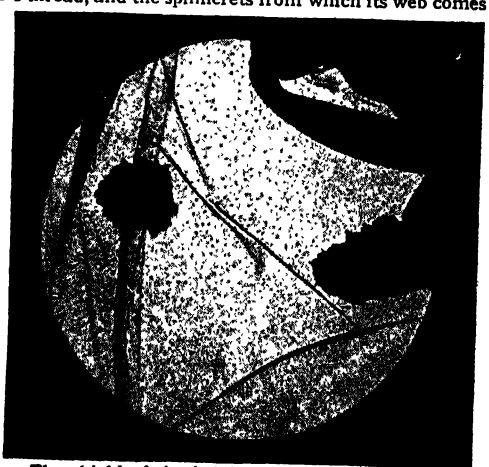
The head and jaws of a ladybird



A spider's thread, and the spinnerets from which its web comes



A small portion of the ladybird's wing



The shield of the ladybird, showing the spots

It is quite startling to look at insects through the microscope. They have weapons of which we never dreamed, and seem so big and powerful that at first the sight of them makes us shudder. Look at the water-beetle's claw, it is like a crab's claw. The neat little ladybird's head looks like the picture of a demon.

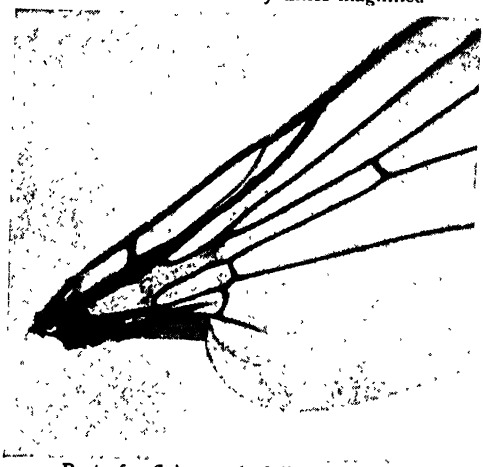
THE WONDER OF HAIR, FEATHERS, & WINGS



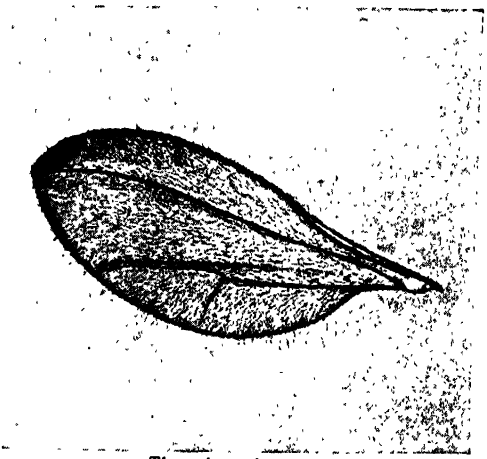
A moth's head many times magnified



The hair of a guinea-pig



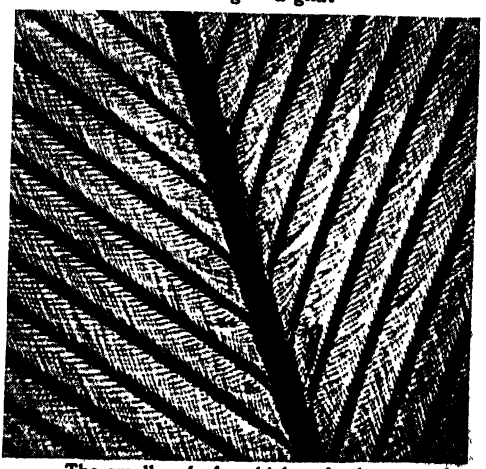
Part of a fly's wonderfully-made wing



The wing of a gnat



The downy end of a small feather



The small end of a chicken feather

The heads of moths and flies do not always photograph well because it is difficult to get the right light on them. The wings of insects, however, are easy to photograph. A gnat's wing is wonderful; it looks like the transparent ear of a big stag. A fly's wing looks, under the microscope, like a wonderful raft.

WATER BIRDS OF THE SOUTH



The wood duck is the most beautiful of the whole family. It builds its nest high up in a hollow tree, sometimes quite a distance from the water.



The noddy is a tern, with the top of its head silvery white and the remainder of its plumage dark brown. It nests in shrubs or low trees.



The story of the egret is a shameful one. Formerly thousands were killed for their feathers and the young left to starve. Through the influence of the Audubon Society, they are now protected and guarded, and are increasing in numbers. This egret is sitting on its rough nest of twigs.



The sandpipers are common in the North but are seen in the South chiefly as they are migrating northward. They are attractive and cheerful.



The brown pelican shown here at its nest belongs to the West Indies and the South Atlantic States. It is hunted for the feathers of its wings.



SNOWY EGRETS OVER THEIR NEST

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INTERESTING AMERICAN BIRDS

CONTINUED FROM 2221



THE birds of North America, like those of all other continents, are not uniformly spread in their residence, or migrations; that is to say, you cannot find the same list of birds in one part of a continent that you do in another, except in the case of a very few kinds. This is owing to several causes, the chief of which is climate and its effect on bird-food. It is evident that birds that are accustomed to get their food altogether from the ocean cannot live inland; and that those subsisting on fish, frogs, and aquatic animals and plants will not be present on the dry interior plains and prairies, or among mountains, where lakes, large rivers, and marshes do not exist. On the other hand, the seed-eating sparrows of the plains, the thrushes, finches, woodpeckers and so forth that depend on insects that throng where trees and plants grow thickly, have no reason to go to the seashore.

In addition to this the birds (and other animals) of the Pacific side of the continent are different, on the whole, from those of the Atlantic slope; and those of the Mississippi Valley differ to a great extent from both. The snowy ranges of the Sierra Nevada and the Rocky Mountains are too high for most of the Pacific birds to cross; and the wide, dry, treeless plains prevent a large number of the birds of the eastern half of the country from ranging much westward of the Mississippi River, although the more wooded and well-watered character of northwestern Canada enables eastern birds to extend their range much farther west there than in the United States. Such things as these influence the range of birds.

BIRDS OF THE NORTH AND BIRDS OF THE SOUTH

But there is another sort of distribution. Some birds are accustomed to go even to the Arctic regions to spend the summer and rear their young; others are able, or choose, to go only to the northern border of the United States, or may remain there all the year round, because they find in the northern half of the continent water and food that suit them. These are seen in the southern half of the Union only when passing through it to and from their winter home in the tropics; and in winter various Arctic birds come south only as far as the northern tier of our states. If you will draw a curved line on a map from Boston through Buffalo, Cleveland, Chicago, and northwestward to and along the upper Missouri River, you will define about the southern boundary of this northern "province;" and its birds have been described in other volumes

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of THE BOOK OF KNOWLEDGE under the title of the " Birds of Canada."

But a great number of our birds either live all the year round south of this line, or when they come to us in summer do not extend their northward migration beyond the central United States; and a good many of them are not to be found at any season north of the Carolinas on the coast, or Tennessee and Oklahoma in the west. Similarly on the Pacific coast southern California and Arizona have birds never seen north of the hot, dry district.

WHY ARE BIRDS DIFFERENT IN DIFFERENT STATES?

The only explanation of these variations in geographical distribution is that the variety of climate and food make conditions in one region suitable for certain kinds of birds and not suitable for others; and each species inhabits that district or " zone " where it thrives best. As for those of the Southern States, to be described in this article, most of them belong to families the greater number of members of which belong to the tropics, so that it would appear that our species are an adventurous overflow northward of these families. Most of them migrate to spend the winter in Mexico and Central America. Their absence is somewhat compensated for by the inflow of northern birds, which are satisfied with the winter temperature and freedom from snow of the Gulf States, so that this region has more birds all the year round than any other part of the United States. This is owing to the fact that birds may find food there when northern states are under a pall of snow, ice, and cold winds.

Beginning with the water-birds, it may be said that most of the sea-fowl and the ducks pass on in spring to northern breeding-places, so that only the laughing-gull, with the slate-colored head, and a few terns, represent in the South the great gull family. The large, crested Caspian tern, the smaller but similar royal tern, and several other rarer ones make their nests among the pebbles of the sandy islands along the coast. All these sea-swallows are dressed in white and pearl-gray with black caps. Two or three kinds of dark-colored terns are also present, one of which, the noddy, reverses the usual coloring, for the top of its head is silvery white, and the rest of the plumage dark brown. It differs from the others, all of which lay four heavily blotched eggs with little or no nest, by making a rude nest in bushes and low trees, and laying whitish eggs. Great colonies of noddies inhabit the Tortugas Islands. A relative of these is the black skimmer, a tern-like bird with a very long straight beak, the lower part (mandible) of which is longer than the upper. The bird flies close to the water, with this long under lip cutting the surface, and so scoops up any little fish it can catch.

Along the coast of the Gulf of Mexico are to be seen every year a few tropic-birds, boobies, darters, cormorants and man-o'-war birds, elsewhere described; and great numbers of brown pelicans. These last are resident in Florida, and are protected by law on certain islands in Indian River, and on the west coast; otherwise they would doubtless all have been killed or driven away by tourists or by men who want their great wing-feathers for millinery.

THE MOST BEAUTIFUL AMERICAN DUCK

Of the few ducks the only one that needs mention is the wood duck—the most beautiful of all our ducks, and known in summer all over the United States wherever woods and waters lie together. The female is streaked brown, but the drake wears a splendid dress. His head is rich, glistening green, the feathers prolonged backward into a pointed crest. A white line runs on each side from the red base of the bill over the eye to the tip of the crest, and other white lines diversify the checks. The back and tail are dark green, the breast chestnut, the flanks buff, and the under part of the body white; and these blocks of color are separated by lines and touches of white.

This lovely duck has another very interesting characteristic, for it makes its nest, not beside some marshy lake or stream, as do the mallard, the black duck and others, but in a hollow of a broken tree or dead stub. This may be sixty feet or more above the ground, and sometimes it is a mile or more from any water, so that one wonders how the ducklings are to be got down and given an opportunity to learn to swim. The drake leaves that to the mother, and she manages it in several ways. Sometimes the little ducklings, soon after they are born, are

SOME OF THE MOST INTERESTING AMERICAN BIRDS



RUFFED GROUSE



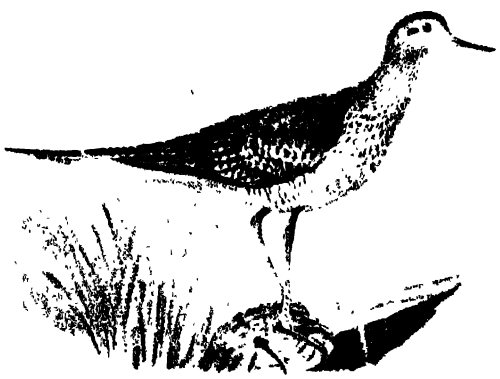
BLUE JAY



MOCKING BIRD



QUAIL, OR BOBWHITE



UPLAND PLOVER



CALIFORNIA JAY

Here are some common birds of the fields and woods. The ruffed grouse and the quail are game birds, and the mocking bird is one of our sweetest singers. The jays are noisy and quarrelsome. The upland plover is really a sandpiper.

just pushed out of the doorway of their home and float down without harm like balls of down; and sometimes they are carried down, one by one on their mother's back; but usually she lifts them in her bill by a wing or leg and carries them to safety. If water is near by they go into it at once, but frequently have to scramble a long way to reach it.

BIRDS KILLED FOR THEIR BEAUTIFUL FEATHERS

Many kinds of wading-birds are residents of the South, where the extensive swamps and marshes along the Gulf coast, and the lower reaches of the Mississippi afford them the food and nesting-places they like. They are mostly of the heron tribe. Remarkable for their beautiful rose-red plumage, the flamingos and the roseate spoonbill are now very rarely seen although formerly common; and the same is largely true of the egret, or white heron, its lesser cousin, the snowy egret, and the fine glossy ibis.

The present scarcity of all five of these most beautiful of water-birds is owing to their having been killed, ruthlessly and incessantly until recent years, for the sake of their exquisite plumage. That any remain is to the credit of the National Association of Audubon Societies, which not only has obtained protective laws from state legislatures, but has paid for guarding the birds while rearing their young, when only the coveted plumes are to be obtained from the parent-birds, thus entailing the death of the forsaken young.

Among the other herons, the great white and the great blue, each standing three feet and a half high, the Louisiana, the little blue, the little green, and two night-herons are still common in that region. All feed on fish, frogs, snakes, crayfish and similar creatures found in the marshes, and build rude nests of sticks in trees and bushes growing in or near water. Sometimes hundreds of these nests are crowded together in a great company called a rookery. Some of these species, as the blue herons and the night-herons, are also found elsewhere in the United States.

Marshes, not only along the southern coast, but all over the interior as far north as the Great Lakes, are inhabited by various bitterns and marsh-hens or mud-hens, known in the books as gallinules, rails and coots. These are plump, brownish or purplish birds, varying in size from that of a chicken to that of a partridge. They are good swimmers as well as runners, and feed on insects and small animals. Most of them are good eating, and one, the little sora, is a favorite table-bird in the South. In such places, too, you will find the bittern—a long-necked, long-billed, streaked bird, that has the habit, when alarmed, of stiffening its body into an upright attitude, with its beak pointing straight up. Then its stripes blend with the light and dark lines of the reeds about it, and it can scarcely be seen. The bittern is the bird that makes the loud booming we hear in the marshes at dusk, and among its many names are "stake-driver," and "dunk-a-doo."

Shore-birds—sandpipers, stilts, oyster-catchers, plovers, curlews, and their like—are noticeable in the southern and central United States mainly during their spring migrations, when they alight on our shores after a night spent in crossing the sea from the West Indies or Venezuela, and for a few days haunt the beaches and wet lands, then pass on to summer residences in the far North.

SOME GAME BIRDS WHICH ARE LEFT

A few, however, remain with us and are well-known to gunners. The largest of these is the woodcock, which is nearly the size of the bobwhite and dwells in wet woods. It is mottled brown with broad blackish bars across its head, neck and back, and flies with a startling *whirr* when you come near it. Like the snipes, it probes in soft earth and sand with a sensitive bill, which feels the earthworms and buried grubs that it seeks; and it feeds mainly at night, resting by day in some shadowy recess, where its nest and white eggs are half hidden among fallen leaves.

The snipe is much smaller, and dwells in wet lowlands where in the autumn it, and many other kinds of shore-birds, are sought by gunners aided by trained dogs. On the higher, dryer grounds are to be found the Bartramian sandpiper, usually miscalled "upland plover," and certain true plovers. The plovers are birds somewhat bigger than a robin, with rather long legs, and bills that resemble those of a pigeon; most of them are black and white, with touches of brown, and with a dark ring about the neck. The most familiar are the golden plover, known all

over the world, and the killdee, whose noisy yelling is to be heard in all open country, where its eggs are likely to be found on the ground in cultivated fields as well as in wild uplands.

This brings us to the family of game birds, including the bobwhite or "quail," the ruffed grouse and the prairie chicken, descriptions of which will be found elsewhere. The only one of the group that is distinctively southern is the turkey.

WHERE OUR DOMESTIC TURKEY CAME FROM

Our wild turkey, which, before white men and their guns came to this continent, were to be found numerously all over the eastern United States, is the same as the Mexican turkey; and there is a second species in Yucatan. It was found by the Spanish conquerors of Mexico, early in the 16th century, domesticated among the Indians, and living specimens were sent back to Spain, and soon became domesticated there and elsewhere in Europe. The people had a vague idea as to where this new fowl came from—some thought from Turkey, others from India. In France, therefore, it is still called *l'Inde*, but in England it was known as Turkey-bird. The British colonists in New England imported it under this name with their chickens and cows; and in this roundabout way our barnyard turkeys got back to their native soil, very little changed from their wild brethren, which are now rare except in thinly settled parts of the Southwestern States.

Another bird that formerly was to be seen in the central part of the country in enormous numbers every summer was the "wild" or "passenger" pigeon. It is now extinct; and its story is so well known that it need not be repeated here.

Another smaller pigeon, the Carolina, or turtle, or mourning dove, as it is variously called, is still common all over the country, and especially in the South, where in winter vast numbers gather to pass the cold months, and in some states are regarded as game birds. This dove is smaller than the domestic pigeon, and utters a plaintive, moaning note, constantly heard in the woods in early summer. It nests not only in low trees, but on rocks, stumps, and logs, or even on the ground in the prairie regions; and lays two eggs on a very rude little platform of twigs.

Next come the birds of prey, few of which call for notice, because most of them are northern birds, and have been pictured in other chapters, as may be found by consulting the Index. Two vultures, the turkey-buzzard and the carrion-crow, are peculiar to the South, although examples are to be seen now and then all over the country. Both are black throughout and have the head and neck naked of feathers; but in the turkey-buzzard the bare head is red, and in the carrion-crow this part is blackish. They feed almost altogether on carrion, and in far southern towns are protected as scavengers, throng about the streets and buildings, and range over the farm fields. Both, although so disgusting when seen near by gorging themselves on offal, or devouring some dead animal, are beautiful in flight. "On outstretched, immovable wings they soar overhead in graceful circles, perfect pictures of 'repose in motion.' Without once flapping their broad pinions, they sail in spirals up the sky until they are hidden by the storm-clouds they have purposely avoided."

SOME HAWKS AND OWLS WHICH WE KNOW

The long-winged, light-colored hawks called kites are common in the South, also, where they glide over the marshes in search of snakes, frogs, and insects on which they feed. The swallow-tailed kite is the one most often seen, and is perhaps the most graceful of all our birds of prey. The fish-hawk, and its tyrannical associate, the bald eagle, are common there, but the golden eagle is unknown, except toward Mexico. Many of the northern hawks and falcons spend their winters on the southern coasts.

Much the same may be said of the owls. The little screech-owl, the barn-owl, the great-horned, and the barred owls belong to the Southern as well as to the Northern States, but most of the species breed only in the North. One, however, calls for a brief description, the queer little burrowing owl; which may be found from Florida to southern California, and all over the plains and mountain valleys from Nebraska to Utah and southward to Panama.

It is only ten inches long, and is buffy, dotted with white, so that it has the general color of the half-bare ground where it lives; and it stands very upright on rather long yellow legs, and does much running about but little flying. It rarely

MORE INTERESTING BIRDS OF SEA AND LAND



MYRTLE WARBLER



SCREECH OWL



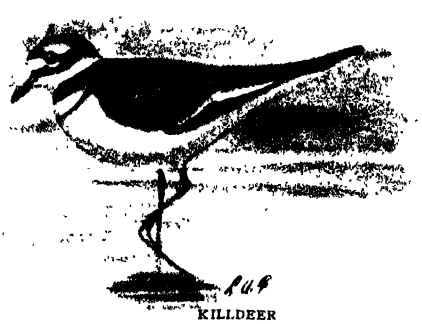
BLACK TERN



BOBOLINK



ROSE-BREASTED GROSBEAK



KILLDEER

The myrtle warbler loves the berries of the myrtle. The bobolink is a cheery songster, and is also eaten for food. The rose-breasted grosbeak is the most beautiful of the family. The screech-owl is entirely harmless.

if ever alights on trees, and lays its white eggs in a nest made in a burrow. Often the burrows of these owls are dug by themselves; but they are glad to find one made by some other animal in which they may make a residence with little trouble in preparation. Therefore, these owls are always common in prairie-dog colonies, not only because they find there many empty holes and burrows suitable to their need, but because these "towns" furnish them with plentiful food; but the old story that they dwell comfortably in the same burrows with the prairie-dogs and rattlesnakes is nonsense. If the owl enters the hole of this or any other ground-squirrel it is to hunt for, and seize, the young ones, and if it had a fair chance it could doubtless kill any snake it met on the same errand. This owl is strong and courageous despite its small size, and catches and eats all sorts of ground-squirrels, rats, mice, shrews and other small mammals, besides insects, snakes and an occasional bird. Those in the Northwest migrate to warmer regions on the approach of winter.

We have now come to the long list of birds of woodland and field, which please us by their elegant form and color, delight us by their singing, amuse us by pretty ways, and, best of all, serve us by aiding in our constant fight against insects that devour our crops, injure our trees and threaten our health. These birds are nowhere more numerous and useful than in the central and southern parts of the United States; but the space allowed to this chapter will permit an account of only that few of them that are peculiarly southern.

A BIRD WHICH CAN OUTRUN A SNAKE

The almost tropical character of the Gulf Coast is shown by the presence there as annual stragglers of several birds whose proper home, as a species, is in the West Indies or Mexico. Such are the mangrove cuckoo, the coal-black anis, "tick-birds," or "jew-birds," which build community nests, and the famous "road-runner" of Arizona and southern California. This is a queer kind of ground-dwelling cuckoo, which can outrun a good horse, and catches for food swift lizards, agile snakes and jumping grasshoppers. It makes a big thorny nest in cactus plants, and feeds its young on lizards. The gorgeous green-and-red tropical trogons are represented by one sort, the coppery-tailed trogon, that crosses the Mexican border into Arizona. In body it is somewhat larger than a robin, but has a crested head and a tail longer than its body. Trogons have the habits of flycatchers, live mainly on insects, but also eat fruit, and make their nests in holes in trees in the mountain-woods. The Mexicans call them "widows," on account of their peculiar crying notes.

The large woodpecker tribe has been pretty well described elsewhere, but some species are never seen in the Northern States. Chief of these southern woodpeckers is the great ivory-bill, now very scarce except in such great swamps as that about Lake Okeechobee. It is good to know that they are carefully guarded and are increasing on Avery Island, in Louisiana, under the protection of the owner, Mr. H. E. McIlhenny, who has formed his great estate into a bird-refuge.

This magnificent woodpecker measures 20 inches in length, and has a chisel-shaped bill truly ivory-like in appearance, 2 ¾ inches long. It is black with a white stripe running from the mouth down the side of the neck and over the shoulders, and the wing-quills are white; and its head is crowned by a high, sharp, scarlet crest.

Other special southern woodpeckers are the red-cockaded, which has a red tuft on each side of the head; the red-billed, which is barred with alternate lines across the back and wings, and has a red cap and red beneath the tail; and the similar Gila woodpecker of Arizona, with a gray head broken by a red patch on the crown.

SOME QUEER BIRDS OF THE NIGHT

We are familiar in the North with the whip-poor-will, the eastern nighthawk, or "bullbat," and with several similar species of the nightjar family on the Pacific slope; but one sort is restricted to the South. This is the noisy nightjar called from its cry chuck-will's-widow. It is, indeed, just a big nighthawk, browner and with more bristles about the great mouth, which opens to trap and swallow the largest moths as well as flying beetles and lesser insects. Like its relatives, it hides away by day on some perch in a shady dell, or at the edge of the woods, and attracts notice in its mottled brownish coat, which is very

beautiful when looked at closely; and at dusk it begins its powerful flight in search of food to be caught on the wing, darting up and down, here and there, with astonishing agility. Now and then it captures and devours small birds. It is at such hours, and all through the night in the breeding season, that the loud calling of these birds one to another echoes through the air, often disturbing our sleep. The eggs of this species, like those of the other nightjars, are laid on the bare ground, or in the Southwest often on the roofs of the flat-topped farm-houses, with no nest whatever; and they are only two, and very darkly blotched.

Passing over the swifts we come in regular order to the humming-birds, where we need not linger except to say that besides the familiar ruby-throat of the whole eastern region, all other species are confined to the region west of the Plains, and mainly to the coast of California and northward. To the next family, the flycatchers, however, we must pay some attention.



THE SCISSOR-TAILED FLYCATCHER

THE SCISSOR-TAILED FLYCATCHER

The most beautiful North American bird of this family is southern—the scissor-tailed or swallow-tailed flycatcher of Texas and Oklahoma. It is a small bird, nearly white in general appearance, with two tail-feathers as long as its body. These long outer tail-plumes, which it can open and close at will, and its rose-pink flanks, make the bird as conspicuous as it is beautiful, as it restlessly moves about, with extremely graceful movements; or perhaps, as is its habit at twilight, it will rise high in the air, and then flutter down in zigzag flight, waving and twisting its beautiful plumes as it falls through the evening air. It spends most of its time in open places, where it can see, dash after, and seize the flying insects on which it subsists; but it builds a deep, downy nest in some woodland tree, and lays cream-colored eggs prettily spotted.

The eastern and western kingbirds are widely distributed and well-known, and two or three additional species of similar habits come a little way over the border from Mexico, one of which, the gray kingbird, is a summer resident in Florida or along the Gulf coast, where its sharp cry, *pitirri, pitirri*, rather than its appearance, distinguishes it from its northern cousins.

The phoebe and other pewees are to be seen all over the country, though nesting mainly in the Northern States and Canada; and the handsome, vigorous loud-whistling, brown-and-yellow, crested flycatcher, which likes to weave an old snake-skin into its nest in some hole in a dead tree, is as well known in the South as elsewhere.

The same may be said of the blue-jay, so familiar in Dixie-land as "jay-bird," and the hero of so many songs and legends among the colored folks there; but Florida has a different, more brownish species of its own. In the Southwest, too, are several all-blue jays, and one green species, but the noisy, blustering, swashbuckler manners of all are much alike. Our crow lives and nests all over the South, but that region, all along the coast, has also the smaller fish-crow, not known north of the lower Hudson valley, which subsists mainly on what it can pick up along the beaches and river-banks, and is a mischievous robber of birds' nests in the spring.

SONGBIRDS WHICH ARE KILLED FOR FOOD

This brings us to the large family of orioles and blackbirds, most of which have been elsewhere described (see Index). The meadow-lark is known in the South as "old-field-lark," and in winter

is so numerous there that it is shot as a game bird. The bobolink is known there as "rice-bird" when in the spring, on its way north, it, with the red-winged blackbirds, attack the rice-crops in vast flocks; and in the fall it is shot and trapped for market in great numbers as the "reed-bird." Of the grackles, or "crow-blackbirds," the great boat-tailed species is peculiarly southern, nesting in colonies wherever swamps attract it all along the coast and large river-courses from Carolina to Texas.

Now we come to the extensive and widely distributed family *Fringillidae*, which includes the sparrows, buntings, finches, and grosbeaks. "They present," says Chapman, "wide diversity of form and habit, but generally agree in possessing stout, conical bills, which are admirably adapted to crush seeds. They are thus chief among seed-eaters, and for this reason are not so migratory as insect-eating species. It is only of late years that their great economic value as the destroyers of weed-seeds has been recognized." Of this long list of streaked, ground-keeping sparrows we need not speak, for all our space is needed for certain brightly plumaged grosbeaks and finches that are exclusively, or especially, southern in their range.

THE BRILLIANT CARDINALS AND TANAGERS

The largest and most widely known of these is the red bird, or Cardinal grosbeak, which remains in the South all the year round. It is among the largest of its race, as big as a robin, but stouter in build, and is dressed in cardinal red, set off by a bold crest and a black ring about the base of the strong, coral-red beak. It comes familiarly about plantations, villages, and city parks, cheering everybody by its joyous whistling, and lighting up the foliage with its gay color; and in the dull days of winter it seems gayer still by contrast with the dull landscape. No wonder that the redbird is a universal favorite, and that many stories gather about it.

The cardinal is often confused with the tanagers by those who do not know the birds very well. The tanager represents an allied family of brilliant plumage very numerous in the tropics, of which we have two species—the scarlet tanager and the summer tanager. The former visits all the eastern United States in summer, and the male is dressed in scarlet, with jet-black wings and tail; but the summer tanager is rose-red, with dusky wings, and is rarely seen north of Carolina and the Ohio River. Both birds are fond of forests, and the latter is especially a denizen of pine woods. "High among the tree-tops of the cool green woods," writes Florence Merriam, "the tanager sings through the summer days. Hidden by the network of leaves above us, we often pass him by; but once discovered he seems to illuminate the woods. We marvel at his color. He is like a bird-of-paradise in our northern landscape." The call of the scarlet tanager is a loud, distinct *chip chur-r-r*, while the summer tanager says *chicky-tucky-tuck;* but both have excellent songs while their mates, which are safely dressed in greenish-brown, brood their eggs on their nests in the trees.

BIRDS WHICH DRESS IN BLUE AND PURPLE

The overflow from the tropical *Fringillidae* has given to the warm South several blue birds of exquisite plumage. One of these is the blue grosbeak, a large finch dressed in dark purplish blue and black, that is not very conspicuous either in appearance or song. Much better known and more interesting is the indigo bird, which is not only southern, but is a delightful summer visitor to all the Northern States as well, where its sparkling music is heard even in late summer when most other birds have ceased to sing. The coat of this little singer is pure purplish blue, with changing tints as the light strikes it; but his wife, at rest in her snug nest in the bush beneath his perch, is dressed in soft browns and drabs, as is the case with almost all birds the males of which are brilliantly arrayed. Were the females and young as brilliant as their mates it would be hard for them to hide either themselves or their nests.

Similar to the indigo bird in size, habits, and song is the lazuli bunting of Texas and the Pacific coast; but only the head, throat and back are blue. The lower surface is pure white, separated from the light blue of the throat by a cinnamon band across the breast. Along the Mexican border we have in summer the varied bunting, whose coat is patterned in a mixture of red, purple, and blue hard to describe; it is uncommon.

This introduces the painted bunting, or "nonpareil," as it was admiringly named by the French people of Louisiana long ago. The head is dark blue, the back and fore part of the wings are golden-green, the wing-quills, rump, and tail dull red, and the throat and whole lower surface bright red. This is the male. The female is olive green above and greenish white below. This elegant finch is more often heard than seen, for it is fond of dense thickets, where it slyly hides as if afraid its shining costume would betray it. It is to be found in summer from North Carolina to Texas, and northward to Arkansas, and formerly many were caught and sold as cage-birds.



THE TUFTED TITMOUSE

THE GREAT FAMILY OF WARBLERS

The warblers are a strictly American family of small, usually brightly colored, insect-eating birds. A large number and variety of kinds of warblers visit us annually from the tropics, and retreat in the fall. A large proportion of these pretty birds go to the far North to make their nests, and few indeed are to be counted among really southern birds. Such are the orange-yellow and green prothonotary; the brown-and-yellow Swainson's warbler, with the cinnamon-striped head; and the greenish, black-capped Bachman's warbler, all of which pass their lives in the damp underbrush along the rivers, and make their nests on or near the ground. Others are the parula warbler, gray above, with a yellow patch on the back, and yellow below, with a black breast, which forms its nest in tufts of Spanish moss; the bluish-gray myrtle warbler, easily recognized by its yellow rump and yellow crown, which spends the winter in great numbers in the Southern States feeding on the waxen myrtle-berries; the bright blue-and-white cærulean warbler, of the southern Alleghanies; the gray, black-checked, yellow-throated warbler; the brightly yellow prairie warbler, which is fond of brushy hillsides and pasture-lands; the yellow-and-black Kentucky warbler, and the familiar black-faced yellow-throat, both of which love stream-banks and swamps and nest on the ground.

The wren tribe includes besides the wrens proper the catbird, mocking-bird and thrashers, and several of the species are distinctively southern in their habitat.

THE MOCKING-BIRD, THE AMERICAN NIGHTINGALE

Foremost among these is the famous mocking-bird, which is rarely seen north of the Potomac and Ohio Rivers, or west of Louisiana. It is noticeably larger than the catbird, measuring 10½ inches from the tip of its curved bill to the end of its long tail; and is ashy-gray above, somewhat lighter on the under surface, and has the wings and tail pale brown, the quills edged with white. It is not, therefore, a very handsome bird, nor especially interesting in manner, although elegant in form; and the affection in which it is held is a tribute to its voice. The Southern people regard it as the prince of American songsters, and compare it to the European nightingale. Formerly many were kept in cages, but they were very unhappy, and the bad practice seems to be dying out.

THE SAUCY WRENS AROUND OUR HOMES

Of the wrens two are far more common in the Southern than in the Northern States. One is the Carolina wren, which is somewhat larger than the familiar house-wren, and utters a startlingly loud song in which, sometimes, the bird seems to mimic others. Bewick's wren is more like the house-wren, but darker brown. Both are often seen in the middle West. The chickadee is to be found all over the country, and the South has a cousin of his in the pretty tufted titmouse, often called "peto" from its call, which is gray and white, with a handsome pointed crest. Another little gray bird of the southern woods is the tiny blue-gray gnatcatcher, which constructs a soft, lichen-embroidered cup of a nest balanced on a tree-limb, and hides within it five bluish, thickly speckled eggs.

THE NEXT STORY OF NATURE IS ON PAGE 2405.



THE GIRL WHO SAVED PARIS

CONTINUED FROM 2236

ABOUT the year 424 A.D. there was born at a little village called Nanterre, very near to Paris, a little girl who was destined to do great things.

Geneviève lived at a time when the Romans had civilized her people, the Gauls, and had taught them to be Christians. Even as a little child of seven she became an earnest Christian, and people loved her for her sweet disposition. While looking after her father's sheep she spun their wool in the shade of the trees. Here, like Joan of Arc, she was in close touch with the beautiful face of Nature.

After her parents' death the little girl went to live with her godmother; and as she grew big and tall and strong she became known for her piety, unselfishness, and care for those poorer than herself. Thus the little maid grew up to a beautiful womanhood.

The peaceful life of the village was disturbed by dread and horror when news came that Attila, "the scourge of God," as he named himself, had crossed the Rhine with his hordes of savage Huns, had destroyed towns on the way, and was marching to capture Paris.

The people would have fled in terror with their most treasured possessions, but Geneviève stood on the bridge over the Seine, and urged them to return to prayer, repentance, and the defence of their homes. At that moment a present arrived for Geneviève from the good Bishop Germanus, and the people, remembering in what esteem he held her, grew ashamed of their terror, and let her lead them home to pray and to arm for defence. The prayer was answered, for the danger was averted; Attila was defeated at Chalons, and then driven out of Gaul.

Paris was threatened, a few years later, with invasion by the Franks, who poured over from the north-east. They came along the valley of the Seine, and besieged the walls of Paris, which the Romans had built. These were strong enough for defence, but how could the citizens hold out against a more cruel foe—hunger?

It was at this crisis that Geneviève showed what fine courage she possessed. Finding no one brave enough to venture outside the walls to get food for women and children who were dying for want of it, she got into a little boat, and, steering it down stream, passed beyond the camp of the Franks till she could land at a safe spot. Then she went from town to town imploring the people to send help to Paris. This she succeeded in getting, and brought into the city

a convoy of boats laden with provisions. The Franks, it is said, regarded her person as sacred, and so, not daring to interfere with her, let her pass.

It would seem from this that the defenders of Paris were not very brave men, and, indeed, at a time later on, when Geneviève was away, the Franks, under Childeric, did capture the city. The Frankish chief was afraid of Geneviève's power, and, fearful that she should come before him, gave orders that she should be shut out of the city. But, hearing that some of the citizens were to be put to death, garbed in her plain shepherdess's gown and veil, she entered, unrecognized, with some country people through the city gate, and went straight to the spot in the fortifications where Childeric and his wild Franks were holding revelry.



GENEVIÈVE BRINGING FOOD TO PARIS

The scene before her was enough to make most hearts quake, and stay the courage of any but the purest, most disinterested soul; yet the brave shepherdess did not shrink from her duty, which was to rebuke and exhort Childeric, and to plead for the helpless citizens. The Frankish chief trembled before her, and granted all her request—safety for the doomed prisoners and mercy for Paris.

Geneviève, who spent all her days in works of charity and pity, lived to an honored old age, and before her death in 512 saw Clovis, Childeric's son, baptized a Christian, and the cathedral of Notre Dame founded. To this day, her memory is revered by the Parisians as the patron saint of their city.



THE DEATH OF GENEVIÈVE, SURROUNDED BY THE PEOPLE SHE HAD BEFRIENDED

THE NEXT GOLDEN DEEDS BEGIN ON PAGE 2445.



HOW LONG DO ANIMALS LIVE?

CONTINUED FROM 2251

WE cannot give exact figures about the age of animals as we can about the age of men and women. We know the age to which men and women live, because the date of their birth is entered in an official register, and the date of their death also is recorded. Famous animals which are kept by men are registered in books kept for the purpose, so we know the age of prize horses, cattle, and other animals. But this does not help us quite as it might, for many animals, when old, are destroyed. If wild, they might live considerably longer.

The prize for the land animals has to be given to the tortoise. This animal lives, under favorable conditions, for between 300 and 400 years. There is one in the Bronx Zoo in New York which is stated to be over 300 years old. Next, we have to take another reptile—we read about reptiles on page 1209. It is the crocodile, which, given fair play in its native wilds, can live for 300 years.

If we believed all the stories we read, we should have to say that the toad, an amphibian, lives far longer than this. It is said to live shut up in a rock, or a tree, or in a piece of coal, and to grow fat on nothing, a close prisoner for thousands of years. We have read about this on page 1216, and we know that we must not believe anything of the sort until we have much better proof brought forward.

It takes an elephant a long time to grow up, and it takes him a long time to wear out. Well treated, he should live to be a hundred. That is the age to which the eagle is supposed to live, but some people put down the age he may reach as 200 years. Even that is young compared with the life of the whale. This can be shown to last for 500 years. We have not a birth certificate with the whale, and he does not invite us to his birthday parties and tell us how old he really is. Clever men, however, say that an ordinary whale lives to the age of 500 years, while some whales have been caught whose appearance has made the scientists believe them to be 1,000 years.

In the following tables the extreme ages of things like the whale and eagle and tortoise are not given. The tables merely set out the ages to

which certain animals often live, not the age to which the very fortunate animals among them may possibly reach.

THE NUMBER OF YEARS THAT ANIMALS LIVE

Rabbit	5	Horse	27
Sheep	12	Camel	40
Cat	13	Lion	40
Dog	40	Elephant	100
Goat	15	Crocodile	300
Cow	25	Tortoise	350
Pig	10	Whale	500

THE NUMBER OF YEARS THAT BIRDS LIVE

Wren	3	Canary	24
Thrush	10	Crane	24
Robin	12	Peacock	30
Blackbird	12	Skylark	30
Hen	10	Sparrow	40
Goldfinch	15	Goose	50
Partridge	15	Pelican	50
Pheasant	15	Parrot	50
Lark	18	Heron	60
Nightingale	18	Crow	100
Pigeon	20	Swan	100
Linnet	23	Eagle	100

It will be noticed that many animals live longer than we do, as it is very rare for man to reach the age of 100.

WHY DOES A BRIDGE GO UP IN THE MIDDLE?

Many bridges are higher in the middle, that is, between the ends, but not all. If you look at a plain girder bridge by which the railways cross many roadways, you will find that the bridge is quite level throughout its length. But an arch bridge is usually a little higher in the middle than at the ends, and in very old bridges the difference in height is very great indeed. The reason for the higher middle portion is that an arch is the strongest form of building structure. The more pressure is applied to the top of an arch, the closer are its parts pressed together. Arch bridges could easily be made with a roadway quite flat on top, but if they were made so, the roadway at each end would need to be made higher, or the space beneath the arch would be lower. So the most convenient form of arched bridge has been proved to be one which makes necessary a roadway that is higher in the middle than at the ends.

WHY IS LANCASHIRE A COTTON COUNTY?

Nature fashioned Lancashire to be a great cotton manufacturing centre. It is sheltered on the east by lofty hills, which, to a great extent, keep off dry land winds. From the south and west come winds which are moist and mild through passing over the Gulf Stream. The effect of this is that Lancashire has a very heavy rainfall, sometimes twice as heavy as that on the east coast. Naturally, then, the air of Lancashire is moist. This favorable air makes the cotton fibre soft and easy to handle.

When all is well with the climate, one hardly understands how important the weather is to Lancashire; the work goes on so smoothly as to make one think that it might be done equally well anywhere. But when there is a long spell of dry weather, and the east wind blows, then the weavers and spinners of cotton are in despair. The moisture goes out of the air, and the cotton fibre becomes like a new material. It is no longer easy to handle; it becomes dry and brittle, and cannot be made to combine.

In such weather the workpeople have a hard task to earn enough money to live upon. The quality of their work is not as good as they desire it to be, and the quantity of it is very small compared with that which they turn out when the weather is favorable. The worker in cotton in Lancashire is happiest when the rain is steadily falling as he works. It is not cheerful weather to be out in, but all is well with his cotton.

WHY DO BIRDS CAST THEIR FEATHERS?

Feathers become worn and torn and broken, and must be replaced. We do not know how birds manage to molt their feathers; it is one of the wonderful provisions of Nature, whose effects we see without being able to say exactly how they are caused. But the molting of birds is similar to what takes place in other forms of animal life. Horses grow long coats of hair in winter which they shed in summer. Dogs cast their coats. Snakes cast their skins; crabs and other shell-fish cast their shells. If a crab lived always in one shell his body could never grow any bigger. At a certain time in the year his flesh becomes very watery, so that he can draw those great claws of his through the narrow opening at the top of the shells in which they are enclosed, and he comes out of his shell almost as soft and pulpy as an egg in its skin with its shell removed. Birds are never

left bare like this. They molt gradually. Some are so completely robbed of their strong feathers that they are glad to go into hiding until the new ones grow. They are then as defenceless as is the stag which has shed its mighty antlers.

DID ANY OF THE APOSTLES GO TO ENGLAND?

Although many of the Apostles are said to have traveled far and wide, there is no record of any of them having gone to England. Still, this does not make it absolutely certain that none of them went. Britain was within easy reach of Rome, and we know for a fact that the Apostle Paul went to Rome. It is generally believed that Peter also lived and preached in Rome. It is just within the bounds of possibility, though not at all likely, that Paul did visit England. He tells the Roman Christians in his letter to the Romans that he hopes to go on to Spain after he has seen them. And Clement of Rome, a great and good man, in a letter that he wrote to the Corinthians in the year 96 A.D., says that Paul went "to the extreme of the west," or "to the western limit." There is a story that Paul visited South Wales and founded a college there, and the remains of what was said to be this college were discovered and dug out some years ago; but, of course, that is only a story.

There is no doubt, however, that the Apostles literally obeyed our Lord's command, and as far as possible preached the Gospel to every creature. John settled at Ephesus; Matthew is said to have preached in Ethiopia; Bartholomew visited Asia and Arabia. Thomas is reported to have founded the Church in Persia, and Andrew to have gone to Scythia. And there is very little doubt that at a very early date the Gospel was preached as far away as India.

HOW MANY WORDS ARE THERE IN THE ENGLISH LANGUAGE?

A dozen great scholars might give as many answers to this question. One of them, some years ago, gave the number as only 38,000. But a still greater scholar, Professor Max Müller, who was, perhaps, the greatest authority of his time on words, put the number of words in the English language at 100,000. He compared the growth and development of our language with the putting of grain in a sieve. Most of the chaff has been winnowed off, and with it have gone many good grains. Good old English words, which are now considered only dialect words, have gone out of the language. If we include all the words which have fixed places in the dialects of the country, and include also many which we know were spoken in earlier times, we shall have to put the total at 400,000 for the English language.

That number is constantly growing. Words have to be invented for new industries, and they become part of the language. When a new dictionary was made, not many years ago, it was found that the new words necessary for use in relation to electricity and electrical appliances numbered over 4,000. A similar increase had taken place with regard to other arts and sciences. Most of them are purely technical words, but, little by little, they become common words as all of us learn more about science; and so the language grows.

HOW MANY WORDS DO MOST OF US USE?

We need not tremble at the number of words it is possible to use. Our greatest writers find quite a small number sufficient for their purpose. Shakespeare, with all his varied writings, used only about 15,000 different words. Milton needed only 8,000 different words for "Paradise Lost," while the Old Testament contains fewer than 6,000 different words. Some people use only about 800 different words, and most of us use no more than two or three thousand.

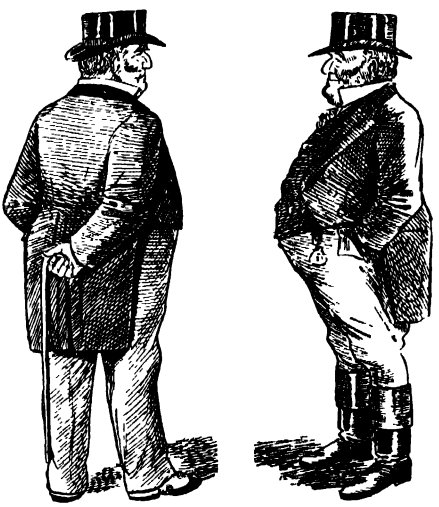
The beauty of writing and speech lies not in the number of words used, but in the choice and placing of them. Simple language is the most beautiful. The finest English writing is in the Bible, in "Robinson Crusoe," and in "The Pilgrim's Progress," and in each of these books the language is so simple that a child may understand, while great scholars find equal delight in it.

WHY IS THE ENGLISHMAN CALLED JOHN BULL?

Every country has a nickname, and is represented in pictures by an animal. The British lion is the animal which stands for England, and John Bull is its owner and master. The lion is the

country; John Bull is the nation. The name of John Bull comes from a work written by John Arbuthnot, a witty doctor and writer, a great friend of Swift and Pope. He was born in 1667, in Scotland, and died in 1735. The sketch that he wrote dealt with the political affairs of Europe at the time, and the countries were made to appear as if they were men and women.

England was John Bull, and Queen Anne was Mrs. Bull. The Church was Mr. Bull's mother. Scotland was John Bull's sister, Peg. England, the nation and country, was made to appear like a man of very good nature, but not without faults. As roast beef and plum pudding are the national dishes, the name of Bull answered very well. John was shown to be an honest, plain-dealing man, courageous, and rather hot-tempered. He was supposed to be always ready to meet the French king with any sort of weapon, in earnest or in play. He was very difficult to deal with, especially if anyone tried to master him; but, treated with kindness and a little flattery, he could be led by a child.



"John Bull" as drawn by Sir Francis Gould, the famous artist of the "Westminster Gazette."

HOW DID WE GET THE PICTURE OF JOHN BULL?

It needed only an artist to draw a fancy picture of such a man, and there was a national figure ready made to represent England for all time. When we look at the famous John Bull which Sir Francis Carruthers Gould draws in the "Westminster Gazette" we see just the man whom Arbuthnot painted in words, only this artist gives John Bull more dignity, and a less uncertain temper.

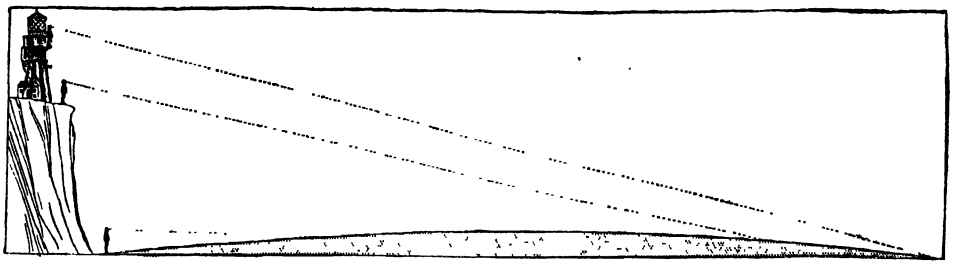
There was a John Bull in real life, a Doctor of Music, who lived between the years 1562 and 1628. He is regarded as the composer of the British National Anthem. Nobody can be quite sure who did write it, but there is reason to believe that the melody was found written down among the papers which Bull left, and that it was made the tune for the National Anthem, years after his death, and without his intending it for such a purpose.

HAVE WE YET DISCOVERED ALL THE WORLD?

No; the Antarctic regions still possess secrets which as yet no man has been able to solve. Many brave men in many fine ships have gone into the gloom and silence of the frozen regions in the hope of discovering the Poles. A great many have perished in the attempt, but a brave American commander named Robert E. Peary, finally reached the North Pole in 1909. In 1911, only two years later, Captain Amundsen, of Norway, reached the South Pole, and was followed a few days afterward by Captain Scott, an Englishman, and his companions, whose brave death aroused the sympathy and admiration of the whole world. Therefore, we may say that all the lands and seas have been discovered, but that is very different from saying that they have all been explored. We may discover a picture-gallery, yet not know what it contains. There is much land still to be explored in Asia. There are parts in the far north of the American continent of which we know very little. In the great sandy, stony heart of Australia there are places of which we have almost no knowledge.

Africa has been traveled from end to end, and from side to side, but we can fix a point on the east coast of Africa and come out at a point on the west coast, and cover ground which no white man has previously crossed.

But missionaries and traders are constantly going farther into the mysterious places of the earth, and learning to know strange peoples; and the unknown land is slowly becoming known.



HOW FAR OFF IS THE HORIZON?

The word horizon is Greek, and is derived from the Greek word for a boundary, which is *horos*. Of course, we understand that the horizon is not really the boundary between earth and sky, but merely the boundary between them as they appear to our eyes.

This is a question often asked by boys and girls. As we stand by the seashore, the sky and the sea seem to meet. We can see a line which seems to be the end of the sea and the bottom of the sky. That is the horizon. Similarly, if we stand upon a plain of land we can, if there are no trees or houses in the way, see where the end of the land seems to touch the bottom rim of the dome we call the sky. That also is the horizon.

Its distance depends upon how high our eyes are from the level of the sea if we are looking across the sea, or from the level of the land across which we are looking if we are looking over a plain. The picture shows clearly how this is so. The boy standing by the seashore is looking out upon the sea from a distance about 4 feet higher than the level of the sea—the height of his eyes from sea-level. He can see just a little more than 2½ miles in front of him, and his horizon is just this distance away. The eyes of the boy on the edge of the cliff, on the other hand, are 100 feet above sea-level, and he can see about 13¼ miles off, and that is where the horizon is. Again, the top of the lighthouse is 150 feet above sea-level, and if a boy looked out on the sea from this point, he would see about 16¼ miles, and his horizon would be 16¼ miles away.

WHY DO WE SEE FARTHER IF WE ARE HIGHER UP?

The scientific explanation of this would be that "range of vision is determined by the altitude of the observer." In simple language, this means that the higher up we are, the farther we can see. That is because our world is a globe. Perhaps you can understand better how this is if you stand in front of a row of houses that form a bulging crescent. Stand close to one of the houses, and turn your head first to the right, and then to the left. You cannot see much of the row of houses—perhaps only a little bit of the house on each side of the one of which you stand in front. Step back into the middle of the road, and look again. Now you can see a good many more of the houses, but still not all if the row is long. Then go to the far side of the road, and a good many more will be found to have come within the range of your eyes.

To look for the horizon is much the same thing. The earth is round, and the farther we are above the ground along which we are looking, the farther we can see. This table shows how far anyone can see at various distances

Height in feet.	Distance in miles.	Height in feet.	Distance in miles.	Height in feet.	Distance in miles.	Height in feet.	Distance in miles.	Height in feet.	Distance in miles
1	1¼	14	5	60	10¼	130	15	600	32½
2	1¾	16	5¼	65	10½	140	15½	650	33¼
3	2¼	18	5½	70	11	150	16¼	700	35
4	2½	20	6	75	11½	200	18¾	800	37½
5	3	25	6½	80	12	250	21	900	40
6	3¼	30	7¼	85	12¼	300	23	1,000	42
7	3½	35	8	90	12½	350	24¾	2,000	59¼
8	3¾	40	8½	95	13	400	25½	3,000	72½
9	4	45	9	100	13¼	450	28	4,000	83¾
10	4¼	50	9½	110	14	500	29½	5,000	93½
12	4½	55	10	120	14½	550	31	5,280 one mile	96

from the earth's surface. At the height of 5,280 feet, which is one mile high, we can see 96 miles. The figures are generally correct, but not quite exact, because to be perfectly exact we must use fractions, which are avoided in the table that we have seen for the sake of simplicity.

WHAT HAPPENS IF AN IRRESISTIBLE CANNON-BALL HITS AN IMMOVABLE POST?

The Wise Man laughed when he heard this question, because it is a good old puzzle, which has often been asked before. But it is like a great many other questions that people puzzle themselves over, even quite grown-up people, who ought to know better; and a great deal of the quarreling about things that go on in the world is due to people trying to answer questions like this, about which we might quarrel to the end of time without getting any further. This is a question that cannot be answered, for the very good reason that it is a question that cannot be seriously asked by anyone who thinks.

A wise man has said that one of the great things that wisdom does for us is to teach us how to ask questions, and wisdom certainly teaches us not to ask silly questions like this one. For do you not see that the irresistible cannon-ball and the immovable post cannot exist together? When we say *irresistible* cannon-ball, that is as good as to say that there is no post which can resist it. When we say *immovable* post, that is as good as to say that there is no cannon-ball which can knock it down. If either of these thing exists, then the other cannot exist. And so, of course, there is no answer to the question what would happen if they existed together, for it is part of the very nature of each of them, as we describe it, that the other could not exist at the same time.

WHAT DOES THE UNION JACK STAND FOR?

The Union Jack stands for British power and freedom all over the world. The name of the flag, though it seems at first to be only a name and nothing more, is really a very excellent name, because the word "Jack" comes from the old "jacks" that sailors used to carry on board ship—a kind of leather coat, stamped with the red cross of St. George. The word "Union" means, of course, the union of the three countries that make up the British Isles, and so we get the idea that the Union Jack is a sort of British Jacket—a jacket of defence for the people of the British Empire.

WHAT ARE THE THREE FLAGS IN THE UNION JACK?

The Union Jack is made up of three flags—the English flag of St. George, the Scottish flag of St. Andrew, and the Irish flag of St. Patrick. St. George, who lived about 300 years after the birth of Christ, was a heroic soldier who gave up his life rather than deny his faith at the bidding of a Roman emperor. Edward III. adopted his name as a war-cry for England, and the beautiful red cross of St. George on a white ground became the English flag. St. Andrew was one of the twelve Apostles, and he was crucified on a cross shaped like the letter X. Some relics of the Apostle are supposed to have been carried to Scotland, and the white cross of St. Andrew on a blue ground long ago became the national flag of Scotland. St. Patrick was carried to Ireland as a slave at the beginning of the fifth century. He lived there for about thirty years, founding many schools and monasteries, and died there a very old man. Many centuries afterwards, the cross of St. Patrick became the national flag of Ireland.

HOW DID THE THREE FLAGS BECOME ONE?

The three flags became one by the union of the three countries. At the beginning of the seventeenth century the crowns of England and Scotland were united, and so the cross of St. Andrew was added to the cross of St. George as the first Union flag of Great Britain. At the beginning of last century Ireland was united to England and Scotland, and the cross of St. Patrick was added to the Union flag. The flag is ingeniously arranged so as to give each cross equal prominence.

When one sees this flag flying on public buildings, or at sea on British ships, or at the British Embassy in Washington, or in far-off parts of the earth, let him remember what it means. It is not a flag of war, but it stands particularly for the memory of three good and brave men, and it stands generally as a sign that Great Britain loves freedom and peace.

THE NEXT QUESTIONS BEGIN ON PAGE 2469.



MAKING A SLED

CONTINUED FROM 2271

A TOBOGGAN is a particular sled which affords boundless delight and healthy exercize to children who live in lands where snow is as common as it is in our Northern winter And we would find a toboggan a source of immense pleasure if by chance we should have one of the old-fashioned Christmas-card sort of winters, with its heavy snow-drifts, and soft, clean snow lying several inches thick in the meadows and lanes, but particularly on the steep slopes, for it is there that children can most safely use the toboggan. Toboggans were first made from curved birch bark by the North American Indians.



1. The sled

There are several kinds of sleds. One is made of iron or steel like a sleigh; the other sort is made of pieces of board nailed together. This latter kind is very easily made, and we shall make one of them Toboggans are good when the snow is quite soft; but as it soon hardens as we glide down a few times, we shall find the sled to be very satisfactory.

To make one you must first get two pieces of board about four feet long, six inches wide, and one inch thick. These you must cut to form the two sides, as shown in picture 1. Now you must get some more wood and cut it into lengths of twenty inches. This wood should not be more than half an inch in thickness. As each piece is cut it should be nailed to the long pieces in the way shown in picture 1. The piece in front may be a little narrower than the others as it is fixed to the turned-up part. Look carefully at picture 1 and you will see two pairs of nails on the side, a little way below two of the top boards. These nails hold in position two pieces of wood stretching from side to side so as to strengthen the sides. Any boy could make a simple sled like this in one afternoon Probably the wood could be used from old boxes, but if not, a carpenter would sell all that is necessary for a few cents

The best way to show the way to use the sled is to tell how it is used by the Children of the Snow, as we may call the boys and girls in Switzerland, Norway, and Canada, where such a sled is an article of everyday play in winter time. Every child has one of them. A merry party goes to where there is a good long, steep slope covered with snow. Then, one after another, the children sit upon their own sleds, and starting at the top of the slope let them slide right down to the bottom, guiding them meantime by touching the snow with their feet; and when the sleds stop at the bottom, the children walk up the slope again. Sometimes several sleds are made into one long file. One boy, generally the eldest,



2. The sled gliding downhill

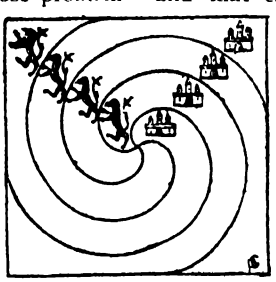
goes first. He sits or lies on his sled and then another boy gets on his sled and puts it close behind the first. He stretches out his legs so that the leader can hold his ankles. All the others do the same in turn till there is a string of children on their sleds. From a little distance the long line looks like a big black snake. When they are all ready, the first boy shouts to them all to hold on tight, and then he lifts up his feet and away they all go. The long line winds to right and left down the steep snow-road, and sometimes it goes faster than any train.

If any let go and fall off they are left behind in a moment, for the line of sleds goes at such a rate that it cannot be stopped easily. Sometimes the children who fall off go plump into the soft snow and are quite buried in it, but in a few seconds they struggle out again laughing. Sometimes the whole line of swift sleds will upset, and then you see twenty or thirty children and their sleds mixed up together, and laughing so much that they cannot get on their feet again. They never get hurt, for the snow is so soft that when they tumble it is just like falling into a feather bed.

It is all fun, and they love it. The Children of the Snow would not like to live in countries that have no real winters. They would not like warm winters at all. But even in the Southern States we sometimes have snow on the ground for a little while, and so, if you feel envious of the fun the Swiss children have, you ought to make a sled and so be ready for the first chance that comes to try these jolly winter frolics of the colder lands.

HOW THE WEAVER CUT HIS CLOTH

THE friends of the weaver, whose problem was given on page 2271, had to confess themselves unable to find the manner in which the cloth must be cut in order to get the desired result, although all tried to solve the puzzle. So the weaver showed how to do it, as seen in the picture which appears herewith. It will be observed that, although there seem to be many lines, the cloth was cut into four pieces, each piece being of the same size and the same shape,



and that each piece contains a lion and a castle To prove that each of the four pieces is the same shape, we may trace the picture and then cut out the pieces, after which, by placing the pieces on the top of each other, we will find that they fit each other exactly. It will be observed that, although each piece has a lion and a castle, in each piece the lion and the castle are in quite different positions. This is essential to the solution. It is impossible to cut the cloth correctly in any other way.

THE PROBLEM OF THE MAGIC SQUARE

IN olden times magic squares were thought to have special virtue, and were used or worn as mascots to keep off disease or bring good fortune to their possessors or wearers. The peculiar feature of a magic square is that, whether the figures in it be added up by vertical columns, by horizontal rows, or by the two diagonals —that is, the sloping columns from opposite corners — the total is the same in every case. Here is a square which is not a magic square, because the figures that make up the vertical columns, the horizontal rows, and the diagonals do not, when added up, make the same totals. But by cutting the square into four pieces, and by putting these four pieces together again in a different way, a magic square is formed in which the addition of each row, each column, and each diagonal gives in each case 34, neither more nor less. This is one of the interesting puzzles propounded by Mr. Henry E. Dudeney in his interesting book of problems called "Canterbury Puzzles." How can it be done?

1	15	5	12
8	10	4	9
11	6	16	2
14	3	13	7

HOW FAST DO YOU WALK?

THERE is a very simple way of telling at what speed one walks. Take a piece of thin string, say, 80 to 100 yards long. To one end tie a weight—a piece of lead or other metal, or even a stone. At a point 44 feet from the weight put a knot or a loop. Then put a second knot or loop 44 feet from the first, and so on along the entire length of the string put a series of knots or loops 44 feet from each other.

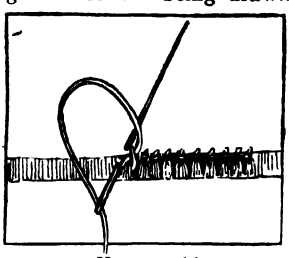
Take in one hand a watch with a second hand. Now drop the weight upon the ground, and walk along at an ordinary pace, letting the weight remain where it fell, and allowing the knots or loops to slip through one hand. The number of knots or loops that pass through the hand in half a minute are the same as the number of miles walked in an hour.

It is always well to know the reason for what we do. It is not enough to know that the number of times we walk 44 feet in half a minute is the same as the number of miles we walk in an hour. We ought to know *why* it is so. The reason is that 44 feet is the 120th part of a mile, because a mile contains 5,280 feet, or 1,760 yards, and a half-minute is the 120th part of an hour. Therefore we are able to walk 120th of a mile just as many times in 120th of an hour as we can walk a mile in an hour.

A DAINTY AFTERNOON TEA-CLOTH

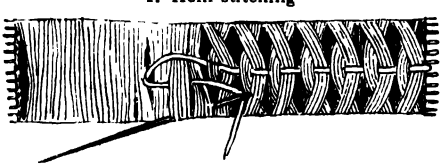
LET us see what we want to make the charming little drawn-thread-work tea-cloth, illustrated on the next page. We want a piece of linen, about a yard square—not too fine, as the finer it is the more difficult it will be to work—and a skein or two of the Teneriffe cotton especially made for this kind of work, which can be bought at any needlework shop.

The first thing to do is to measure the hem. A fairly wide one is necessary, so we will allow six and a quarter inches. The quarter of an inch is for the little piece to turn in, and the six inches, doubled into two, will give us a hem of exactly three inches. When we have measured our hem we cannot turn and tuck as in ordinary work, for our corners must be left loose to draw the thread, but we mark the size of the hem by drawing one thread exactly where we shall sew the hem later on. As a matter of fact, we want more than one thread for the hem, but in all drawn-thread work the insertions are worked first, and this is what we will proceed to do.



1. Hem-stitching

The insertion as shown in the picture is really the very easiest work that can be devised, and can be done by any child who is able to sew well. We begun by removing, in one direction only, as many threads as necessary. This, of course, leaves nothing but loose strands, and it is the uniting of these into clusters which is called drawn-thread work.

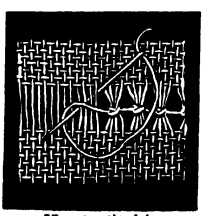


2. Single crossing

First of all, however, it is necessary to measure the space which must be left between the hem and where the insertion is to be, especially if it is desired to work a fine feather-stitching as shown in picture 5, which will greatly increase the value of the work. This fancy feather-stitching has already been explained on page 730.



3. A corner



4. Knot-stitching

Once the space has been decided upon, draw a thread very lightly on each side at the given point. If we want our cloth to be perfectly square we must take the trouble to count our threads, and if the linen chosen is coarse enough this will surely give very little trouble.

This one thread drawn on each side will form at the four corners where they meet a little pinprick of a hole. This is to be a little empty square, which we will later transform into a pretty wheel. For the moment we will use it as a landmark, and, inserting the point of some sharp scissors, we will cut the linen very straight, following the woven threads for two sides of the corner—that is, one inch on each side of the pinhole.

We must repeat this at each corner. Now, to prevent these cut threads becoming loose on the sides of the material forming the corner, we will immediately work a loose buttonhole stitch as shown on page 490. This will save a considerable amount of trouble, and will keep the work neat and tidy.

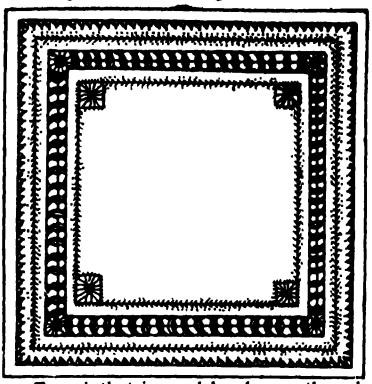
Now comes the most fascinating part—the drawing of the threads. By fraying out the cut part which faces our buttonholed edge, we shall have just enough hold on the threads to draw them out easily. We must not try to draw out several threads at once, for the weaving is done in threads which cross each other, and if we pull two at the same time they will press one on the other, so keeping each other in place. All the long threads being drawn out along the one-inch cut will leave us a band of loose upright threads, and on these threads we will set to work.

For a beginner few patterns are really simpler than the one which is known as *single crossing*. For single crossing, reckon the strands—that is, each lot of upright threads to be taken up with the needle—in sets of five. Two sets are necessary for each pattern. Now we must thread our needles with a long thread, and start in the middle of the buttonhole edge at the extreme corner of the band of loose strands, as in picture 2. Bring the needle down over two sets, back up under the lower and over the upper of these sets; then go down again behind the upper and lower sets, and out below them. The thread is now drawn up, and the two sets crossed. If we repeat all along, our work will look like the insertion in picture 5.

A very useful stitch in the drawn-thread work is knot-stitching, so called because the thread is formed into a knot. This knot is a kind of chain-stitch, made by bringing the threaded needle out on the right side of the work at the top of the material, then bringing the thread down across the loose strands of the material and up again to the right. This forms a loop which is held down at the bottom by the left thumb. Next insert the needle to the left of the thread and under the strands to be enclosed, then through the loop, thus forming a knot to be drawn tight, by moving the thumb and pulling the working thread through. This knot-stitch is used more than any other in hemming drawn-thread work, and is the one shown in picture 4 on this page.

When the insertion, as already explained

above, has been done all round, turn in the edge of the material, fold the hem down in the usual way with the quarter-inch inside, and tuck it neatly all round, exactly along the line of the first drawn thread. The corners must be turned very carefully, otherwise they will feel thick. The open ends will have to be sewn over in little fine over-stitches. Now, we cannot work a hem-stitch without more threads being drawn, so we will again use the point of the sharp scissors and cut as many threads on each side as will be necessary to make a suitable hem—about four or five threads will be sufficient.



5. Tea-cloth trimmed by drawn-thread work

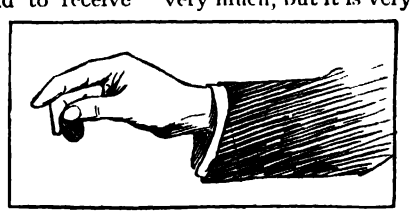
Hem-stitching is shown in picture 1. This is how the stitch is worked Thread a needle with a long piece of cotton, and fasten it to the upper edge of the loose strands, at the right-hand end of them, by taking a couple of stitches, and bring the needle out three threads above the loose strands and threads. Insert the needle into the loose strands, exactly under the place where it last came out, and take three strands upon it from right to left, keeping the cotton under the needle. Draw out the needle; insert it again where it last came out, but this time bring it out three threads above the loose strands, to the left, taking up exactly the same three strands as before.

But what about the corners? When bands of openwork are carried along two sides of a piece of work, a space or "open square" is formed in the corner where the lines of work meet. In ordinary hem-stitching this space is so small that it may be passed over, but where more strands are drawn a filling is necessary, and this usually takes the form of some such wheel as shown in picture 3.

The foundation strands, or spokes of these, are the continuations of the working threads that have been used along the single crossing insertion. Two or more threads are then put right across from corner to corner, and the wheel is worked from the centre. The needle has to be taken alternately over and under one of these spokes, formed by the crossing threads, close round the centre until this has been surrounded four or five times. The needle is linked through the last round of the thread, between the spokes, and the thread is taken across to the vacant corner, where it is fastened off.

THE DISAPPEARING PENNY

A LITTLE practice enables a boy to mystify others with the trick of the disappearing penny. The conjurer offers someone a penny, and as the other opens his hand to receive it he also opens his hand (apparently), and the penny has fled. This is a mere trick of sleight-of-hand, and one needs practice to be able to do it properly The conjurer must see that the sleeve of his coat or his cuff hangs with as much space as possible below the wrist, and it is good also if the sleeve or cuff come as far down as possible Then he takes the penny between his thumb and middle finger, as shown in picture 1, at the same time raising his arm a little above the horizontal, and as his friend opens his hand for the coin he snaps the two fingers, and the coin will disappear up his sleeve. He opens his hand and it is empty. Then as he lowers his arm by his side the penny falls down his sleeve into his hand again. When the young conjurer attempts this trick for the first time he will probably fail, but half-an-hours's practice will give him skill, and eventually, if he is careful, he will be able to do it every time he tries.



1. "Sleeving" a penny



2. How to "catch the coins"

Taken by itself this trick may not seem very much, but it is very effective if introduced among some other tricks. The look of innocent surprize that usually comes upon the face of the poor boy who expected to receive the penny is generally very amusing indeed.

Yet another sleight-of-hand trick with coins is rather clever, and not nearly so difficult to perform as it looks. The boy puts upon his sleeve, as shown in picture 2, a number of pennies or nickels, or some of each, up to as many as six in all, when by simply bringing his arm down quickly while he holds his hand open, with the fingers slightly bent, all the coins go safely into his hand. It seems as if they ought to go scattered in all directions. A very little practice gives proficiency in this trick, but practice should be with a wall in front, so that in case of failure the coins will not go into places where they cannot be easily recovered or do some damage or even hurt a spectator. Of course these are only meant to be tricks.

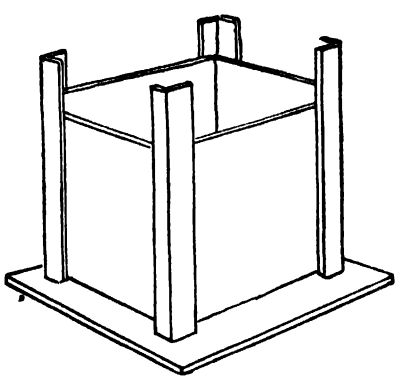
BOX FURNITURE

WE have already talked together about our tools and equipment, and we have studied the main features of box furniture, so that we know how to make the legs, or corner trim as we sometimes say, and are now ready for business. In our carpentry work we shall make lots of different pieces of furniture: a foot-stool, which is easy enough to make when you know how; a general utility box which can be transformed into a window seat; a blacking box which every boy will surely be proud to have as his very own; a dainty little rack for a vase or for books which will look very attractive in the study room; and some other things too.

Just think of the fun in transforming a plain, ordinary packing box into a flower-stand or a table book stand! Come along, big boys, little boys, and their sisters, too, for you all may join the class.

SCRAP-BOX

THIS attractive design has many uses, and it is very easy to construct. The charm of it lies in its very simplicity. For Father's den, Brother's study, or for Mother's sewing-room an artistic scrap-basket is always acceptable. Just try and see how very easy it is to make.



MATERIALS NEEDED. The grocer will probably be able to give you a box about the size of a stuffed-olive box, which is about 10 inches deep and 8 inches square. A box that is only six inches deep and seven inches square will be quite as satisfactory. For the legs or corner trim, we need four strips ⅜ inch thick, 1 inch wide, and 3 inches longer than the height of the box; and four more strips ⅜ inch thick, 1 ⅜ inches wide, 3 inches longer than the height of the box. For the false bottom, we need one piece of board that measures ½ inch thick and is 4 inches larger than the box each way.

DIRECTIONS FOR MAKING THE SCRAP-BOX. First remove the cover or the top end of the box. Then make the corner trim 3 inches longer than the height of the box. Turn the box upside down, and place the false bottom or base upon it, allowing the bottom to project 2 inches all around; and secure it by nailing through it and into the edges of the four sides. Eight nails or screws are sufficient to hold it firmly. If the sides are too thin to receive the nails, put them through the real bottom, and clinch the nails on the inside. It is best to nail without clinching if you can do so. Invert the box, placing it upon its new base.

Now we are ready to make the legs. Place one narrow strip with a wider one, and nail the face of the wide strip to the edge of the narrow one, forming a right angle, and making each side of the angle measure alike. To join them together, use small nails or large brads, placed a short distance apart. A little glue used before you nail the pieces together would hold it firmer. Make all four legs in the same way by putting together a narrow and a wider strip. Nail a leg to each corner, and clinch the nails on the inside if they project. A neater exterior will result if you use short screws about ⅝ inch long and run them from the inside, using four on each corner.

Having joined the false bottom to the box and added the four legs, it is now complete, and ready for the finishing touches. With a piece of sandpaper, rub it carefully, making the sides smooth; and fill with putty all the nail holes and imperfections, making the surface even. You may stain it any color you desire, but a dark mission effect is very pleasing.

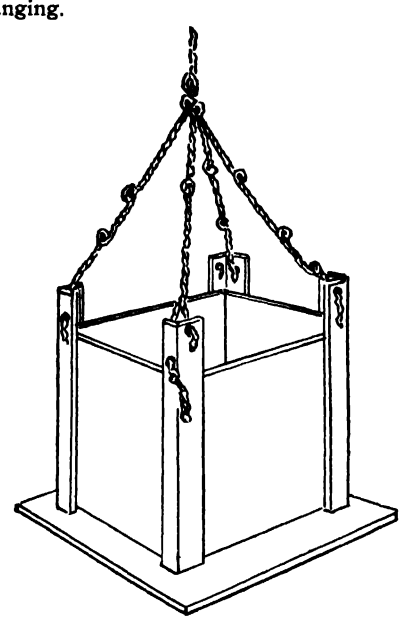
HANGING FLOWER-BOX

THE scrap-box which has already been described, may be converted with a slight change into a hanging flower-box. The materials needed are the same as the scrap-box, with the addition of several feet of ordinary clothes-line.

DIRECTIONS FOR MAKING THE HANGING FLOWER-BOX. Make the scrap-box just as described before. Then bore three holes, each ½ inch, in the end of the leg which projects beyond the top of the box, one hole in one face and two holes in the other face of each leg, all located at different levels as shown by the knots in the illustration. Or you may make just one hole in each leg one inch from the end of the leg, right in the angle where the strips are joined. If you make just the four holes, then, from the rope, cut off two lengths of three feet each. Run one end of the rope through the hole, tie a strong knot on each side of the hole to hide it. Tie a number of knots, and then run the other end through the hole in the next leg. The other piece of rope is attached to the other two legs, and knotted in the middle with the first rope. Make the knots at uneven intervals,

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using two in some and three in others to obtain the desired artistic effect. The charm of these hanging boxes depends largely upon the clever and simple method of hanging.



This little box for holding a flower-pot is designed to be used in pairs, suspended in the window from two pulleys, in such a way that they will pass each other when the plant is drawn down to be watered. If you cannot find a pulley to use, ordinary screw eyes will serve the purpose.

If you suddenly need a little stool to hang pictures, you may instantly convert the flower-box into an ornamental little stool, simply by taking out the outside knots, removing the ropes and turning the box over to stand on its legs.

PERFORATED SCRAP-BOX OR HANGING LANTERN

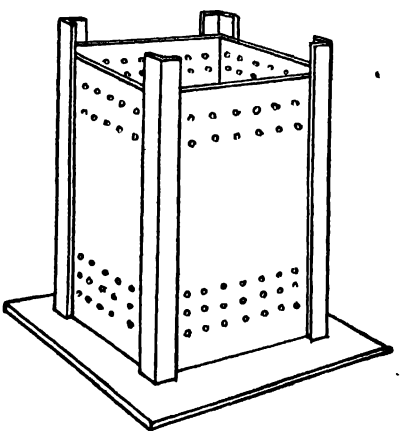
THIS convenient little article has three distinct uses. As a waste paper box or basket, it is very ornamental and unique. As a stool it simply needs to be turned the other side up As a hanging lamp shade, to be used in the hallway where only a soft, dim light is desired, it is also very unusual and useful.

A good size for a scrap-box would be about 15 inches deep and 10 inches square, though an olive-oil box or a stuffed-olive box with slightly different dimensions would answer very well indeed.

MATERIALS NEEDED. Besides the olive-oil box we need the following materials for the legs and top: four strips ⅜ inch thick, 1 ⅛ inches wide, and 4 inches longer than the height of the box; and four more strips of the same thickness and length but 1 ½ inches wide; and for the top, one piece ½ inch thick, and 2 inches larger each way than the end of the box. If you are going to use it as a hanging lantern, you will need the strips for the crown frame; four pieces ½ inch thick, 2 inches wide, and 8 inches longer than the outside width of the box. A dozen feet of ordinary clothes-line completes the requirements.

DIRECTIONS FOR MAKING. Remove the cover of the box and plane the edges so they will be smooth and even. Remove one side. Next place the box on its end and put the top in position so that it will project the same distance over the sides, and then carefully nail it on the box, using only enough nails to hold it firmly, and not too many to mar the effect. Turn the box over again and put on the legs, which are made in the usual way. Measure the distance between the legs, and saw the cover just the size to fit snugly in place. Hang the door, using the hinges on one side. Now then, you will need to have a ruler, a sharp pencil and a sharp eye. Mark the places for six rows of holes near the top of the lantern and four rows near the bottom, allowing one inch from centre to centre of holes. Bore the holes ½ inch in diameter where you have placed the pencil marks on all four sides. With your ruler, trace a light line on the top between opposite corners. On this line, about ¾ inch from the corner mark a point, which should be about half-way between the outside corner of the leg and the corner of the top. Bore a hole ½ inch in diameter through the projecting corner, and repeat for the other three corners.

Lay one of the lower pieces of the crown frame on top, keeping it in line with the holes, and allowing the frame pieces to project equally over the top. Mark the place for the holes and bore them ½ inch in diameter, and use this as a pattern to bore the other



three pieces. Your scrap-box is now complete. If you wish to use it as a hanging lantern, take four equal lengths of the rope, run one piece through each corner, and knot the ropes. Suspend the frame three inches

above the top of the lantern, and tie knots in the ropes to hold it in place. Place a few knots at unequal distances, and tie the ropes all together at the other end. Your artistic hanging lantern is now ready.

If you are going to stain or varnish it, do so before putting on the ropes. It may be stained a soft shade of green, or brown to harmonize with the surroundings.

FOOTSTOOL

A FOOTSTOOL is a convenient piece of furniture in any house, and the boy carpenter can easily make one, for his Mother or for himself.

MATERIALS NEEDED. A dry-goods shop or a grocery store can supply you with a box suitable for this stool. You want one that is about 12 inches square and 5 inches deep, or an oblong box that is 14 inches long, 8 inches wide and 5 inches deep. In selecting your box, choose one that is free from knot-holes, brands or other blemishes, for you want the finished article to look well. For the top, you will need a piece of wood about ¾ inch thick, and 2 inches greater than the box in length and width. If the box is 12 inches square, then this piece must be 14 inches square. For the legs, we need four pieces, ⅜ inch thick, 1 ⅜ inches wide, and 7 inches long; and four other pieces, ⅜ inch thick, 1 ¾ inches wide and 7 inches long.

DIRECTIONS FOR MAKING THE FOOTSTOOL. Make the legs in the usual way by joining the two pieces, and then round off one end of each leg, so that there will be no sharp corners to split when the stool is moved along the floor.

Take the cover off the box, and turn the box upside down, and nail a leg on each corner, carefully clinching the nails on the inside. Turn the box right side up again, setting it on the legs, and then place the false top on it, allowing an even projection on each side. Nail this top on securely, using about two nails over each leg, so that it will look neat.

The footstool may be improved for use in the kitchen, where the cook likes to have a useful stool with a place for the hand on the top so that she may carry it in one hand when the other hand is full. To make the opening for the hand, mark with your pencil the middle of the top piece, then bore two holes and saw out the wood between them, making a hole about an inch wide and two and one-half inches long. Smooth the edges with sandpaper. This stool is useful in the nursery for the play table, or handy for Mother to have when hanging pictures, and in fact is serviceable in a dozen different ways.

If you wish to use your footstool as a fern-box, it may be made in such a way that it will serve two purposes. We know a little boy who made this article from a Baker's Chocolate box which measured 9 ½ inches wide, 10 ¾ inches long, and 4 ¾ inches deep. The legs were made 4 inches longer than the box. The top, which was made from a piece of board which the carpenter cut for him, measured 11 ¼ inches wide and 12 ½ inches long.

He preferred to use screws, and so bored four small holes through the inside of the box into each leg, and then with the screwdriver finished securing the screws. His screws were short enough not to show on the outside of the legs, and yet long enough to hold the legs firmly to the box. For use as a fern-box he inverted the footstool and placed a large drooping fern inside. The effect was very pretty.

HOW TO TELL TIME BY THE SUN

IN primitive times and even in the early days of our own country, time was reckoned by the rising and going down of the sun, the shortening and lengthening of shadows. The savage still uses primitive methods for noting time. He sets a stick in the ground and marks its shadow with a stone, so that a party following him may estimate the leader's distance ahead by noting the changed position of the shadow which measures the length of time since he went by.

This gives the idea of the sun-dial, which marks time by the shadows and indicates noon when the shadow is shortest. The simplest form of sun-dial is a tree-trunk or post standing "plumb," by which we may follow the changing direction of the shadows thrown by the sun. But this dial is not accurate, for in winter the shadows are longer than they are in summer, and the sun itself does not keep good time, for some days it is fast and some days it is slow. There are only four days in the year when it is strictly on time, April 15th, June 15th, September 1st, and December 25th. The post must be parallel to the axis of the earth, so that the shadow will be the same all the year around. Only at the North and South poles would the post stand straight up and down.

The old-time stick method of telling time was used by our great-grandmothers, who could tell it was time to cook dinner when the sun's shadow fell at a certain point. Some became expert in telling time by the way the shadows fell across the porch or doorway. It is easy enough to tell when it is nearing midday, for then a man's shadow becomes slowly shorter until it seems to be fixed, the sun having reached its highest point, and it is easy too to tell when it is just past noon, for then the shadow becomes slowly lengthened. This crude method of telling noontime is just the same as the accurate method of "taking the sun" to determine noon at sea, when the mariner with his instrument, the sextant, measures the angle between the horizon and the sun.

WHAT PLACE ARE WE IN?

THE GAME OF WHERE IS IT?

HERE is a game to play while we are sitting round the fire on a cold winter's day. One boy reads out the descriptions given below, and the game is to guess the places.

The answers are given in that part of our book beginning on page 2515.

THE CITY OF CROWDED STREETS

1. How hot it is! The sun's rays beat down from a cloudless sky so fiercely that our eyes turn with relief to the broad river speeding by eastwards. Low down on the banks are crowds of people with brown skins, and here and there some wearing white turbans. They are bathing in the water and crowding up and down stone steps, leading to curious little buildings. Can these be little temples? Further along the banks steamers are busy loading indigo and saltpetre to take away to England. All around we hear strange speech, and we look in vain for clean streets. How narrow and crooked they appear!

THE CITY WITH THE GOLDEN DOME

2. It is winter, and we are in a big city where the streets are deeply covered with snow; there is no sound of vehicles, only the tinkling of sleigh-bells and voices to break the silence. The shops have signboards and objects hung outside to tell what they sell, because many of the people cannot read, and certainly we cannot recognize the letters. We follow the way the sleighs take and come to a cathedral with a golden dome and wide granite pillars at the entrance. In front is a river—but a river frozen over. The ice will bear carriages; it will stay there till the spring, and when it melts there will be a religious ceremony and a blessing of the waters.

TREES FOR EUROPE'S SHIPS

3. We are in a country covered with thick forest, so dense that it is only with great difficulty we can make a way through it. Hark! That must be men sawing wood and chopping down trees, and a young Englishman, wearing a white helmet, is directing them, and—why, yes; those big animals working so hard are elephants. They are piling up the big logs with their strong trunks as though they were handling little sticks, and others are dragging along the chained trunks. The Englishman tells us they are clearing a way for a railway through the forest, and the teak-trees they are cutting down are going to countries in Europe, to be used for building ships. He says there are nearly twenty thousand square miles of tropical forest, and that some tigers and leopards have been seen near. Do you know what country we are in?

WHERE STARS COME QUICKLY

4. What a flat mountain! It looks as though a giant plane had been used to cut off the top. The mist lies like a white dining-cloth on it, and dotted about the lower slopes and nestling under them are pretty, low houses surrounded by verandahs and sheltered by trees. Arum lilies are growing wild, for the air is quite warm. Away over the sea the sun is setting, and a large vessel is steaming out of the harbor to make its way northward to England. Perhaps it is carrying diamonds, feathers, wool, or wine.

The town reminds us of a Dutch one, but the cathedral is English, and there are plenty of English names over the shops. Night comes quickly, and the stars soon appear; but we look in vain for the Great Bear.

SIX RIVERS FLOWING INTO A BAY

5. These people must be English, for we understand what they say, and could easily ask where we are; but let us see if we can find out without troubling anyone. Before us lies a fine stretch of water enclosed by land on the west and east and north, and with half a dozen little rivers flowing into it, somewhat like fingers joined on to the palm of a hand. And do you notice that long, long wall in the distance with a lighthouse at one end? Big steamers from Asia and Australia are at anchor in this harbor. "Boom!" goes the midday gun in the fort on little Drake's Island

It is going to rain, so let us explore the lighthouse close by. The man in charge takes us up it, and tells how it was brought in pieces from a rock fourteen miles out to sea, where a new lighthouse now stands. We face about landwards and look down over the town at the hills, rivers, and blue moorland in the distance.

IN THE TRAIN FOR DAYS

6. We are standing among wheat which grows all around us as far as our eyes can see. The land is very flat, and the air pure and sweet. About a mile away is a large wooden farmhouse. In the distance we see the smoke of an engine. It is coming nearer; now we see the train, and notice it is made up of large saloon carriages, and that the engine has a "cow-catcher" in front. The passengers have been in the train for days, taking their meals and sleeping in it; and before leaving it some will have traveled right over high mountains among snowy peaks, where the brown bear hides away. What is the railway?

WHERE THE COCOA-NUTS GROW

7. We seem to be on an island in the midst of a big sea, for there is water everywhere, except here and there where small islands are scattered about. We are standing on a beautiful white sandy shore, dotted with lovely colored shells It is only one o'clock in the day, yet, when we look at our little pocket compass and then at the sun in the sky, we find the sun is to the north of us.

Away inland the ground rises in terraces, forming a kind of amphitheatre, up to the highest point in the middle of the island, which looks about 8,000 feet above the sea, and reminds us of a broken-down volcano. We turn up one of the gorges, and see palm-trees with cocoa-nuts growing on them, great tree-ferns, sugar-canes, and oranges. We meet some contented-looking, brown-skinned natives, who tell us in broken French that they are going to dive for oysters to get mother-of-pearl from the shells that they find.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 2515.

THE STOMACH AND DIGESTION

AT the end of the last story, on page 2174, we left the food when it had passed through the mouth and entered the stomach. Here we learn what the stomach is and what are its uses. We learn, for instance, that just as the mouth and teeth protect the stomach from what is not fit for it, so the stomach protects the bowel from what is not fit for it. Then the stomach produces special chemical substances that change the food, and, besides all this, it churns the food for some hours after every meal, so that when it enters the bowel it is much changed, and is ready for the bowel to act on. The bowel itself is still more wonderful and useful than the stomach, and it is helped in its work by various glands, such as the pancreas and the liver, which pour their own special juices into it. Then the bowel passes into our blood what is fit for it, and by this we live. Nothing is of any use to us but what we absorb into ourselves—and this is just as true of what we hear and read as of what we eat.

HOW TO EAT & BE HEALTHY

CONTINUED FROM 2174



WE have seen how the food, properly chewed and mingled with saliva, is swallowed, and so finds its way into the stomach. This is the largest and most important of the hollow organs of the body; but when we call it hollow, we must not fancy that it is something like a football, with a great space inside it. There are no such unfilled spaces in the body; and when the stomach is empty, as it should be for some time before every meal, its walls are pressed against each other. When food enters it, they make room—and the greater the supply of food, the more the stomach enlarges in proportion. A healthy stomach always accurately fits its contents.

The stomach is a muscular bag which lies in the abdomen—that is, the part of the body which we usually call "the stomach"—rather to the left side, and under the left part of the liver, which is the largest gland in the body. This bag has two openings in it—one on its upper side, which is the opening of the gullet and admits the food; and one on its right, where the stomach becomes narrow and almost pointed, and leads into the bowel. The walls of this bag are beautifully made, first of a very smooth coat on the outside, which enables it to move freely against its neighbors; then of a middle coat, which is made of muscular fibres; and finally of an inner lining, a mucous membrane, which is wonderfully skilful.

The middle or muscular coat is made of three layers of fibres running in various directions, and it has most important duties. It *churns* the contents of the stomach. When we have eaten anything, these various fibres start moving in a regular way, for a long time—even three or four hours—sending the food from end to end of the stomach, backwards and forwards, and turning it over so that every part of it can be properly digested. Also, as the walls fit closely on to the food, whether we have taken much or little, they help to crush and soften it. But the stomach possesses no teeth, and its walls are thin, and far less powerful than the thick muscular walls of the heart. A bird or a fowl has no teeth, but as a substitute the walls of its gizzard are very strong, and it swallows pebbles which help grind its food after it has been somewhat softened in its crop. If we do not use our teeth, the stomach cannot do their work for them; but its muscular wall does its best.

If people eat too quickly, and do not chew their food enough, and especially if they also eat large meals, the muscular coat of the stomach

naturally gets tired and stretched and flabby, and cannot churn the food properly, and then we get indigestion; but this never happens if the stomach is properly treated, and if we keep our blood in good order, so that the muscular fibres are well nourished by it.

THE WONDERFUL LINING OF THE INNER COAT OF THE STOMACH

The inner coat, or lining of the stomach, is still more wonderful. It is a mucous membrane—that is to say, it has tiny glands in it which produce mucus. But that is not all. It also has, at least, two other sorts of little glands in it. These glands are little pits, or tubes, in the lining of the stomach, lined with living cells which have a most remarkable power. One sort of these glands produces the substance which we studied on page 1813 under the name of hydrochloric acid. We have already learned that a salt results from the combination of an acid and a base. Now, table salt or common salt is sodium-chloride, and it is a necessary part of the food of all living creatures, including ourselves. In us, and in a large number of animals, it is perhaps one source of the hydrochloric acid produced by the "acid glands" of the stomach.

The sodium-chloride, or salt, is brought to the cells of the glands by the blood, and they split it up into its parts. They pour into the stomach hydrochloric acid, which serves a most important purpose in digesting the food. If a chemist desires to split up sodium-chloride outside the body, he can do so, but only with a great deal of trouble and by the use of very powerful substances which are not found in the body at all.

A THING THAT NO MAN UNDERSTANDS AND THAT MEN CAN ONLY MARVEL AT

No one understands at all how it is that this very strong compound can be split up by the cells of the glands in the stomach, without any difficulty or the use of any powerful acids. We can only put it down to the power of the life of the gland-cells, and marvel at it.

Sometimes, when people are ill, their stomachs cannot produce the hydrochloric acid they need to digest their food, and then the doctor gives them hydrochloric acid as a medicine. It enters the stomach, and does just what is needed; and in such cases its effect in making the person better is almost like magic. Such persons owe their relief to the study of the body, which has taught us that the stomach, when healthy, produces this acid, and that our food cannot be digested without it.

Every time we take salt at our meals we should remember what use the gland-cells of the stomach will make of it—not at once, but when it has entered the blood, and has been carried by the arteries to nourish and supply the stomach wall.

The second kind of special gland in the stomach—and neither kind is found anywhere else in the body—is no less wonderful. If we look at the cells of these glands under the microscope, as they are *before* a meal, we find a number of little specks of something lying in them. These specks have been made by the cells—from the blood, of course. But if we look at these cells, taken from an animal *after* it has had a meal, we find that all the specks have quite disappeared.

THE LITTLE SPECKS OF PEPSIN AND THE WORK THEY DO AFTER A MEAL

The reason for this is that, about half an hour after a meal enters the stomach, these specks of stuff are melted by the gland-cells and poured into the stomach, where they are mixed with the food as it is churned. These specks of stuff consist of a *ferment*, called pepsin, without which the stomach cannot digest the food. Often, when people are ill, and their stomachs are not making pepsin properly, we take the stomach of a calf, get the pepsin out of it—it is got as a yellowish powder—and give it as a medicine to the ill person. This enables him to digest his food; but it is really the cells of the stomach of the calf that are digesting it for him.

If either hydrochloric acid or pepsin be given to a healthy person, his stomach ceases to produce them for itself. This is another instance of the great law of all life, that the health of any part of the body can be maintained only if it does its own work. If its work be done for it, it becomes lazy and helpless. Pepsin can easily be got at any drug store, and many unwise people now dose themselves with it, not knowing that they are thereby preventing their own stomachs from doing their own

work. When you start taking pepsin regularly, then you must go on doing so, for your stomach is made lazy and incapable. The only right time to give pepsin—except for a very short period—is when we know that the stomach has become quite unable to make it for itself.

HOW STARCH IS TURNED TO SUGAR IN OUR BODIES

Now we must see what the hydrochloric acid and the digestive ferment pepsin do to the food. First, we must know that, for about half an hour after a meal, these things are not produced at all. During that time the starchy matter of the food is being turned into sugar by the ferment which the saliva brought to it. When that is sufficiently done, the stomach pours forth its own products, and then the digestion of the starch must cease, for it can occur only when the food is alkaline—which the alkaline saliva makes it—and so it must cease when the contents of the stomach are turned acid by the hydrochloric acid that is poured into it. Now begins the second stage of digestion in the stomach. The hydrochloric acid first acts upon certain parts of the food, and makes them ready for the pepsin. The pepsin then ferments or digests them, until they are changed into new substances which are fit to be taken into the blood.

Thereupon the stomach opens its door into the bowel, which is guarded by a strong ring of muscle and has been tightly shut all this time. The stomach contents pass through into the bowel, a small quantity at a time, then a pause, then another dose, and so on, until the stomach, which has been shrinking again all the time, becomes empty.

THE USES OF THE STOMACH, AND HOW LIFE IS POSSIBLE WITHOUT IT

Thus we can learn the uses of the stomach. It is a place where the saliva can digest, or begin the digestion of, the starch of the food. It is a bag which holds a quantity of food and takes care of it, so that we can eat a meal and go about our business until we need another. It is a guardian of the health and right working of the bowel, for it admits nothing but soft, almost liquid, stuff to the bowel, and that only in suitable quantities at a time. And it is a living bag which, by its living power, produces ferments to digest the food, and churns the food about so that these ferments can get to every part of it. As a matter of fact, the stomach produces more ferments than one, and more acids than one, but we have named the principal ones.

We usually rather overrate the importance of the stomach, notwithstanding all its powers. It is quite possible to live happily and healthily without a stomach at all, when the stomach has been entirely removed by an operation, and the food passes straight into the bowel from the gullet. Of course, in that case people must take small meals, and certainly they must use their teeth well.

The food is digested in the bowel, and we shall have to learn that the digestion which goes on in the stomach can be done without, and is never the most important part of digestion. All the digestion that the stomach does, and that the saliva does, can be done entirely within the bowel. This is not to say that the saliva and the juices of the stomach are not important and valuable; but it is to say that, in this all-important matter of preparing the food for its entry into the blood, the body has more than one or two or three "strings to its bow," as people say.

THE TUBE WHICH DISPOSES OF THE USELESS PART OF OUR FOOD

The three classes of our food that require digestion are the proteids or albumins, the starches and sugars (called carbohydrates), and the fats. The first group are partially digested in and by the stomach; the second group are partially digested in the stomach, but not by it; the third group are not digested in the stomach at all. Thus the fat in milk, which, when it rises to the top, we call cream, undergoes no change in the stomach, but floats to the top of the food there as it does in milk. There is only one part of the body that can digest everything properly, and that is the bowel.

The bowel is a very long, coiled tube, which begins where the stomach ends, and ends in a straight part called the rectum, where the useless part of the food, and also a substance called the bile, which the liver sends to the bowel, is collected and disposed of every day by healthy persons. This is not a subject that people think it suitable to talk

about much; but it is a very wrong and improper thing to think it an improper subject of study or knowledge. It is part of the wonderful working of the body, and just as perfect and worthy of our admiration as breathing or the beating of the heart.

THE LONG TUBE WITH THREE COATS WHICH RECEIVES OUR MEALS

The bowel is some twenty-five or thirty feet long, and this extraordinary length teaches us that it must have some very important work to do, which requires time and thoroughness. Every meal we eat spends from twenty-four to thirty-six hours in the bowel, being digested all the time, and sorted out and prepared for use and for the disposal of what cannot be used.

The bowel, like the stomach, has three coats, and they are of the same kind. The middle coat, however, is made of muscular fibres that mostly run right round the bowel or tube, in circles—not of fibres running in all directions. The reason for the difference is that the contents of this long tube do not require to be churned backwards and forwards, for the stomach has already softened them and made them almost liquid. They require merely to move slowly onwards, and the circular fibres of the muscular coat of the bowel contract, one after the other, in a slow movement like a sort of wave. We are quite unaware of these movements, though we can often hear the curious little noises which they make as they send the food along. Sometimes —as when we have eaten green apples, or have not properly chewed our food— the bowel makes these movements rather strongly, and *then* we become aware of them, and say we have stomach-ache or "colly-wobbles"—a very expressive word—or colic.

THE WONDERFUL GLANDS AND THE WORK THEY DO IN DIGESTING OUR FOOD

But it is the inner coat or lining, the mucous membrane, of the bowel that is specially wonderful and interesting. Besides the glands that produce mucus, like those in the mouth and nose and many other places, it has a large number of special glands which produce digestive ferments for fermenting, or digesting, the food. Already we know quite a number of special ferments which different parts of the bowel produce, and there are doubtless many more. But the bowel does not produce the most important and powerful of the digestive ferments any more than the stomach does. They are produced by a special gland called the pancreas, which we find in all animals that have backbones, and which sends its juice through a special little tube that opens into the bowel about four inches below its beginning— so that the food from the stomach is very soon exposed to the action of this remarkable juice.

The pancreas of the ox is often eaten as a great delicacy, especially by people who are ill, and by people who do not mind paying a good price for what they eat—and it is usually known as sweetbread. The juice of the pancreas, or sweetbread, contains at least four ferments, three of them being the most powerful ferments that we know. One of them digests albumins or proteids, one of them digests starch, and another digests fat. This is the first time the food has met anything that can deal with the fat or oil in it, which is one of its most valuable parts. Neither the saliva nor the juice of the stomach is of any use in dealing with fats.

THE CELLS OF THE PANCREAS AND THE WAY IN WHICH THEY HELP US

The cells of the pancreas are not unlike gland-cells seen anywhere else. They, too, have specks of stuff in them which they have made, and which they melt and pour through the tube of the pancreas into the bowel when food enters it. The food, when it leaves the stomach, is acid, and this acid, when it enters the bowel, is the signal to the pancreas that its juice is wanted. If, for any reason, the juice of the pancreas is not forthcoming, we find that the person cannot digest and use the fats in his food. All his digestion suffers, but the digestion of fats suffers most, for there is nothing to take the place of the juice of the pancreas in this respect.

The liver sends its own product into the bowel, as the pancreas does, and just at the same place. This product has the special name of bile; and when anything is wrong with its production, we say that the person is bilious. The bile is brownish yellow in color, and its color is due to the remains of the red matter, or hæmoglobin, of old red blood-cells that have been broken down in the liver. The bile is a help to digestion

in many ways, though it does not contain any ferments. It seems to prepare the fat of the food for the juice of the pancreas to act on, and it does this by breaking up the fat into a number of very tiny drops which can easily be acted upon and digested. We say that it turns the fat into an "emulsion." Also, the bile is very poisonous to microbes. So, indeed, is the hydrochloric acid produced by the stomach, and, as a general rule, if our stomach and liver are healthy, their products destroy all the dangerous microbes that we may happen to swallow.

HOW THE STRENGTH OF OUR FOOD ENTERS INTO OUR BLOOD

Now, when the food has been digested and turned into new chemical substances which are fit to enter the blood, the part of it which is of no use—such as the hard and almost woody stuff in the stalk of a cabbage—is passed along the bowel until at last we get rid of it. But now the useful, digested part of the food has to enter the blood. This it does in a very special way. Throughout many feet of the bowel we find a new kind of thing occurring in its mucous membrane. These things are little projections—there are countless thousands of them—which stick out a little towards the inside of the bowel. They are covered with a layer of cells, and are richly supplied with capillary blood-vessels. Their business is utterly different from the business of any of the glands we have been reading about. They exist not to digest the food, but to absorb it—to take it into the blood when it is digested.

THE THOUSANDS OF CLEVER LITTLE CELLS THAT PASS THE FOOD INTO THE BLOOD

The whole object of eating is to get into the blood the substances it requires. Everything else is meant to prepare the food for its absorption into the blood. The cells covering these tiny projections of the mucous membrane of the bowel are alive, and extraordinarily clever. They pick up from the contents of the bowel what is ready for the blood, and pass it through themselves and through the thin walls of the blood-vessels that are pushed in little loops into the projections, and then it is carried by the blood-stream to every part of the body. We can take a piece of the mucous membrane of the bowel of an animal, and if we keep it warm we can watch it *living* for a time.

We can see, then, how the cells covering these countless little projections do their wonderful work, and we notice the very curious fact that, while they pass into the blood all the other parts of the food that has been made ready for them, they do not pass the fat into the blood. The fat is passed into another set of tiny vessels called *lacteals*, from the Latin word for milk, which is *lac*, and so it is carried upwards through the body until the lacteals pour the fat into some of the large veins that lie near the neck. The lacteals have this name because, after a meal, they look as if they were filled with milk. It is the drops of oil or fat in them that give them this milky appearance. We do not know why the fat of the food should have this rather roundabout way of getting into the blood.

HOW WE MAY EAT WITHOUT GAINING STRENGTH

And now we must learn the great lesson that we live not by what we eat, but by what we absorb. If a man were to eat the best food in the world in large quantities every day, but were not to absorb it into his blood, he would die of starvation as surely and as quickly as if he ate nothing at all. The food is of no use so long as it is in our mouths or in our stomachs or in our bowel, but only when it is in our blood. If it does not enter the blood it is all wasted, and until it enters the blood it does nothing for us.

Foolish people who have something the matter with the wonderful machinery we have described, or who do not care whether they eat too much so long as it tastes nice, may be surprized that their food does not give them strength. They forget that we live only by what we digest and absorb, and that may be very little, though we eat very much.

And other foolish people do the same with their minds, or, most of them, with the minds of children. Grass is good food for an ox, for the ox can digest it. It is useless and worse than useless to us, for we cannot digest it, and if we cannot digest a thing it does not matter how steadily we eat it. A child's mind can "inwardly digest" only certain things, and only those things are of any use as food for its mind. If other things, which

it cannot digest, are given to its mind—such as lessons or hard books fit only for grown-up people—then it gets indigestion; it loses its appetite for learning, and it gains nothing at all. You might as well feed a child's body on grass, as feed its mind on some of the things which children's minds used to be fed with, and, I am afraid, are still sometimes fed with. If what we have been reading about here cannot be digested by your mind, it is worth no more than if the paper of this book were given to you for your supper or your breakfast. You might chew it ever so well, but you could not digest and absorb it; and you would die of starvation.

But all this does not mean that you are to do nothing for yourself. The body has to work hard and steadily after we take a meal, or it cannot be digested. If it is not digested, it cannot be absorbed, and we must die of starvation. In just the same way the mind must work after a meal.

WHY THE MIND NEEDS FOOD AS WELL AS THE BODY, AND HOW TO FEED IT

As we have seen, the food of the mind must be of a kind that the mind can work upon; but when we have seen that the food is of the right kind, and when your mind has got it, then it is for *you* to digest it. No one can do that for you, any more than your father or mother can digest your dinner for you. They supply the dinner, but it is of no use unless it is digested and absorbed, and you alone can do that.

They can supply you with food for your mind, and the right sort of food, but you alone can digest it. If you do not digest and absorb the food for the mind in this book or in any other, it may please you at the time, just as useless or even poisonous food may please the mouth when we eat it; but it will be of no real use, and will be worth nothing for the life of your mind, which is the life that your body exists for.

So the great question is: "*How can we digest our mind's food?* And the answer is, first, by *thinking it over*. Just as the tongue and the stomach, and the muscular wall of the bowel, turn the food over and over, so we must think over the things we read and hear. Then they are ready for digestion. Digestion is turning the food into other things best suited for absorption. Well, you must change what is said in this book into *your own words*, look at it in your own way, think it out over again for yourself; throw away anything you find bad or useless, as the bowel does with the food; combine what you learn in the story of life with that you learn in the story of the earth—and so gradually these lessons will become absorbed into your mind.

FOOD GIVES THE BODY STRENGTH; FOOD OF THE MIND GIVES US LIFE & POWER

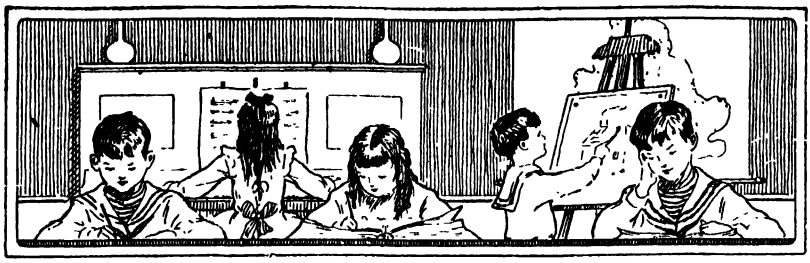
Then, just as the food, entering the blood, gives life and power to the body, so what we learn, when it is really absorbed into our minds, gives them life and power; and just as the body, supplied with food, is ready to act and to move, so the mind, if it absorbs good mind-food, is made fit to act—to think new thoughts and to guide our conduct.

One thing more. The body needs a new supply of food every day from birth to death. It does not do just to eat when we are small and then to stop when we grow bigger. We have to take in fresh food all our lives, or our lives will end. The same is true of the mind. It does not do only to learn things at school, and then to stop. There must be new mind-food for the mind all our lives, as there must be new body-food for the body all our lives. If not, the mind will starve and pine, or even die. There are too many people in the world who take great care to go on feeding their bodies, but who have long ago stopped feeding their minds, or who feed them only with food which is not nourishing, and cannot be absorbed, but is forgotten; and their minds *do* starve and die.

THE DIFFERENCE BETWEEN THE BODY & THE MIND, WHICH GROWS FOR EVER

But if we are wise we go on feeding our minds; and we discover the wonderful fact of the mind which makes it different from the body, though we have seen how similar are the laws of the two. This difference is that, though the body stops growing after a time, so that the best food, perfectly digested and absorbed, will not make it any taller or stronger, the minds of human beings, if daily fed with good books and thoughts and talk, beautiful sights, and noble music, will go on growing, getting wiser and better, as long as we live.

THE NEXT PART OF THIS IS ON PAGE 2463.



READING

MAKING NEW WORDS FROM OLD ONES

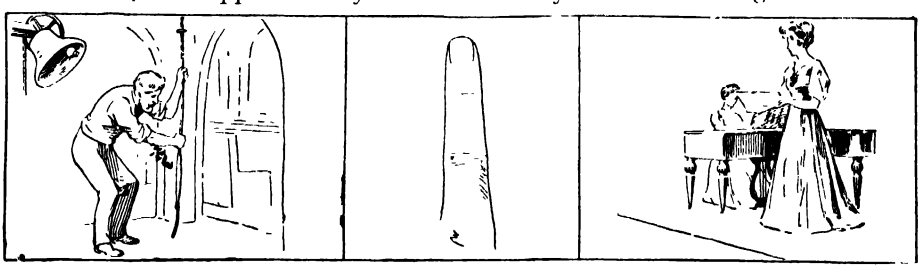
CONTINUED FROM 2234

IT is a long time since we had a really proper reading lesson, so we had better have one now, something like the lessons which we had at the beginning, only harder; for, of course, we are getting on splendidly now, and do not want words that are too easy.

It is interesting to take a word of two syllables—like AD-DER—and see how many words you can make of it by putting letters on in front, like this:

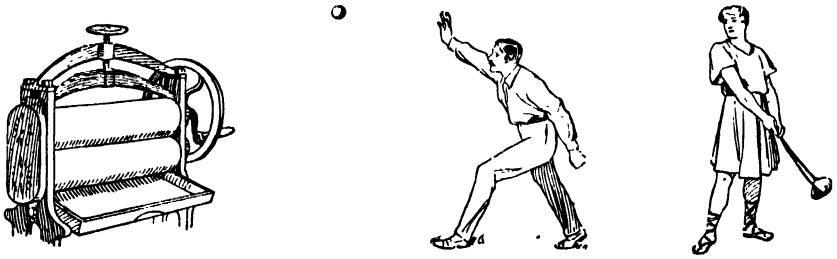
ADDER LADDER BLADDER

Then take the two syllables IN-GER. They do not make a word by themselves, but suppose we try them in this way to see what we get:



RINGER FINGER SINGER

Then try putting another letter in, and we shall get these words:



WRINGER FLINGER SLINGER

WRINGER—a mangle. FLINGER—a man who flings or throws something. SLINGER—David was a slinger, when he put a stone in his sling and killed Goliath with it. We all know the story quite well.

Just look at those words again carefully.

What is a Ringer? A person who rings.

What is a Singer? A person who sings.

What is a Flinger? A person who flings.

What is a Slinge.? A person who slings.

So we learn from this that if we add the letters ER on to a word that means to do something, we make a new word that means the person who does it. Let us see if this is true in other words:

If you BUY marbles, you are a BUYER.

If you SELL them, you are a SELLER.

If you OWN silk-worms, you are an OWNER.

If you LEND money, you are a LENDER.

If you READ this, you are a READER (and quite a good one, too).

Now for two or three longer words, with three syllables; we have not had such long words yet, but there is no need to be frightened.

If you GARDEN, you are a GARDENER.

If you play CRICKET, you are a CRICKETER.

If you play FOOTBALL, you are a FOOTBALLER.

To close this lesson, I should like you to learn these lines. They are better than nursery rhymes, and there are no hard words in them:

When in the morning we arise,
What beauty meets our opening eyes!
We learn from flowers and sunny skies:
That God is Love!

As all day long we go our way
In school, or playground, work or play,
How all around us seems to say:
That God is Love!

When comes the darkness of the night
We have no fear, we feel no fright;
The stars above are shining bright:
And God is Love!

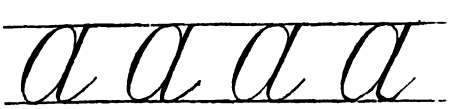
So through all time, and all life long,
For young or aged, weak or strong,
This is the great eternal song:
Our God is Love!

WRITING

LEARNING TO WRITE CAPITAL LETTERS

WHEN next Tom and Nora brought paper and pencils for their mother to show them how to write the capital letters, Nora asked if there were any more capital letters like small ones, for both Tom and she found them so easy to write.

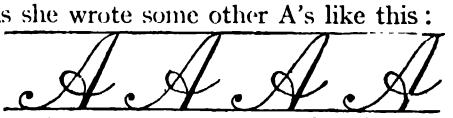
"Here is one which is quite an old friend," said her mother, as she wrote A like this:



"You will both write that easily," she then said. "Some of the capital letters are written in two different ways. A is one of them."

"May we learn the other way, too?" asked Tom. "Perhaps one is nicer than the other."

"You shall see," his mother replied, as she wrote some other A's like this:

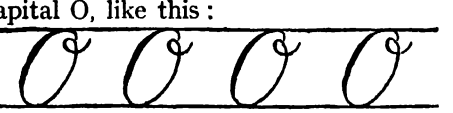


"This A starts with Tom's little curled spring near the lower line, and makes a long up-stroke to the right double the height between the lines, and then comes down to the lower line with a thick down-stroke, and makes one of Nora's pretty loops over the up-stroke."

"Like tying a bow," added Nora. "Mother, the first A is the easiest to make, but this A is a pretty letter."

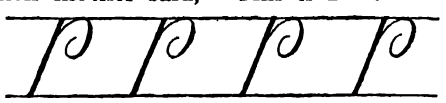
"So it is," said her mother; "and no one could mistake it for a small a."

When Tom and Nora had written both A's, they were shown how to make capital O, like this:



"That is an oval, mother, like small o!" exclaimed Tom, who remembered the hat and the dish; "but it does not end in the same way."

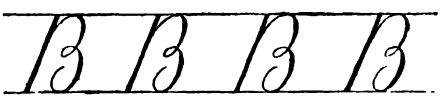
"No," said Nora; "it tries to tie itself in a knot at the finish." And she and Tom busily set to work to make O's that tried to tie themselves into knots. When they had written them, their mother said, "This is P":



"See, the pencil makes a long down-stroke, then returns up over the down-stroke and out to the right, with a big curve about half the distance of the stroke, and ends in the middle of the curve."

The down-stroke and up-stroke were quite easy, but the curve had to be tried two or three times before it could be written well. Tom tried to think of the first part of X uncurled, and Nora thought of capital O, but starting on the left and untied.

"P will help us to make B," their mother told them when they had finished it. "Here is B":



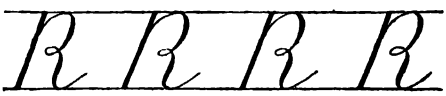
"B is just like P until we get near the end of the curve; then the pencil turns round to the right, makes a small loop, and ends with another curve touching the bottom line."

"It seems as though B had grown out of P, like j from i," said Nora, while she was copying her mother's letter.

"I think not, Nora; but they are near relatives. We use our lips to make them both. Watch mine while I say P, B."

Nora tried saying P, B, then Pay, Bay, and understood how her lips made both P and B.

"The last letter we are going to make to-day is something like B," their mother told the children as she wrote some letters. "It is R. What do you think of it?"



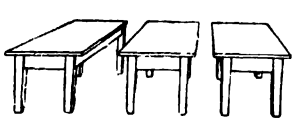
Both the children saw how much it was like B. It started with the same long down-stroke and up-stroke as P and B, and the first large curve to the right was the same. The loop in the middle was like the loop of B, but the last curve went round to the right instead of to the left as in B, and opened outwards.

"If we notice the difference between P, B, and R very carefully now," their mother said, "they will give us no trouble in the future, and will be easy to remember. Three little brothers—Percy, the youngest; Bertie, the middle one; and Roy, the eldest."

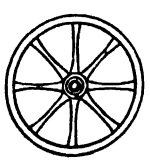
ARITHMETIC

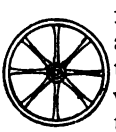
HOW TO MULTIPLY NUMBERS

HERE are three tables, each with 4 legs. How many legs are there altogether? To find the answer to the question we must add together 4 and 4 and 4, which tells us there are 12 legs altogether. Now, instead of saying 4 and 4 and 4 make 12, it is simpler to speak of "three fours," and say "three fours are twelve."



Again, if the front wheel of a carriage has 8 spokes, and the back wheel also has 8 spokes, how many spokes are there in the two wheels together?





By adding together 8 and 8, we find the answer is 16. And, in just the same way as before, we say, instead of 8 and 8, "twice eight" make 16.

In each of the above examples we had to repeat a given number a certain number of times, and then add them together. If we had worked the examples on paper we should have had to arrange them like these.

```
 4 and 8
   4     8
   4     —
  —     16
  12
```

This process of adding together repetitions of a given number is called

multiplication. If we write the number three times and do the addition, we say that we have "multiplied that number by 3." If we write the number twice and add, we "multiply the number by 2."

By adding 8 spokes of one wheel to 8 spokes of another, we found that "twice 8 make 16." In the same sort of way we can find how much twice any other number makes.

Suppose we begin with "twice one," and go on as far as "twice twelve."

On this page are twelve sets of pictures, each set containing two groups of objects. By counting the objects in any set of pictures, we find how many "twice the number in any group" makes. For example, in the fourth picture we have two groups of children. Counting the children in the first group, we say "one, two, three, four"; then going to the second group we say "five, six, seven, eight." So we get the result "4 and 4 are 8."

Under each picture is written the answer to the addition sum. But, as we saw at the beginning of the lesson, we call "1 and 1" "twice one"; "2 and 2" we call "twice two," and



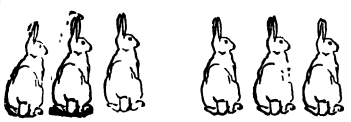
2

1 and 1 make 2



4

2 and 2 make 4



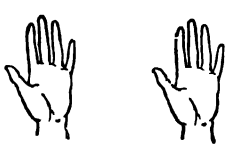
6

3 and 3 make 6



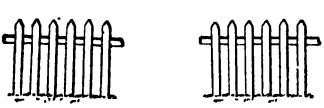
8

4 and 4 make 8



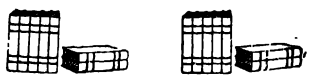
10

5 and 5 make 10



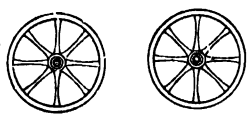
12

6 and 6 make 12



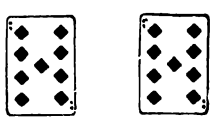
14

7 and 7 make 14



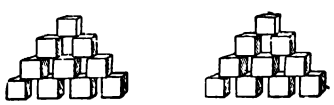
16

8 and 8 make 16



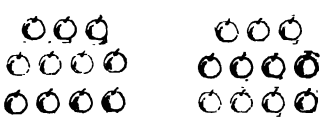
18

9 and 9 make 18



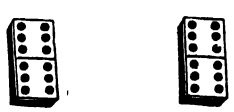
20

10 and 10 make 20



22

11 and 11 make 22



24

12 and 12 make 24

so on. If we write down all these results in a column we have:

Twice	*Twice*
1 are 2	7 are 14
2 are 4	8 are 16
3 are 6	9 are 18
4 are 8	10 are 20
5 are 10	11 are 22
6 are 12	12 are 24

This forms what is called a *table*, which means simply a list of results. We must learn this "2 times" table by heart. Of course, the word "twice" (which is only written at the top of the table) must be repeated in every line; so that we say "twice 1 are 2; twice 2 are 4; twice 3 are 6," and so on.

When we know the table perfectly, so that we can answer such a question as: "How many do 7 and 7 make?" quickly and without having to think too long about it, we can go on to the "3 times" table.

To make the table, write down the numbers from 1 to 12 in a column. Next, by the side of this column write down the results of the "2 times" table—that is, say to yourself "twice 1 are 2," and put the 2 down by the side of the 1 in the first column. Then say "twice 2 are 4," and put the 4 down by the 2 in the first column, and so on.

1	2	3	7	14	21
2	4	6	8	16	24
3	6	9	9	18	27
4	8	12	10	20	30
5	10	15	11	22	33
6	12	18	12	24	36

Now add together the two figures which come in each line. 1 and 2 make 3. Put the 3 down at the top of a third column. Next, 2 and 4 make 6.

Put the 6 down under the 3 you have just written. Going on in this way, we get in the third column the figures 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36.

3 times	*3 times*
1 are 3	7 are 21
2 are 6	8 are 24
3 are 9	9 are 27
4 are 12	10 are 30
5 are 15	11 are 33
6 are 18	12 are 36

These are the results in the "3 times" table. We can write it out and learn it in the way we did the "2 times."

ANSWERS TO EXAMPLES ON PAGE 2230.

1	2	3
26002	37259	77951
437	4023	3141
5340	584361	203
78	294	5925
904		64
32761	625937	87284

THE HOMES OF THE LITTLE GOBLINS

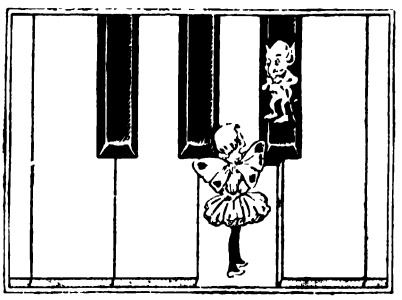
WE have talked about the fairies a very great deal, but are you not wondering what the little goblins are doing? In the very first talk we had together we opened our magic kingdom, the piano, and saw a long black line and a long white line. Very quickly we discovered that the white line consists of about fifty little white pieces, where the fairies dwell, and if you have good memories you will remember that we found the black line to be made up of thirty-five little black houses, arranged in twos and threes, and in each little black house a goblin dwells.

Such good-hearted little goblins they are! They are always ready to help the pretty fairies; and wonderful friends they prove themselves to be.

The fairies have their houses so close to the goblins' that it is quite easy for one to help the other. Supposing Fairy F wants to go out for a little while, it might be very difficult for her to do so, because in our magic kingdom no one is ever refused. Fairies always answer truly and sweetly if only we approach their notes carefully. This being so, we can quite well see that the fairies would think it a grave breach of good manners if anyone called on Fairy F and no answer came. So what can the little fairies do when they want to have a little holiday?

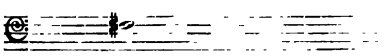
The secret was whispered in the world a long time ago; it traveled down the ages to me, and now I will tell it to you. The fairy goes to the little black note next door to her, on the right-hand side; she tells the little goblin who lives there how very much she wants a holiday, and asks him if he will be so very kind

as to answer any visitors who call. The little goblin smiles, and tells her how happy he is to be able to help her. "Thank you, dear goblin," replies the little fairy. "I shall lend you my name for all the time I am away, and you must carry a flag which I now give to you. It is known as the little *sharp*. Everyone knows that it is the sign carried by a kind little goblin who is keeping house for the wee fairy immediately next door to him, on his left-hand side. And because your voice is just a very little higher than mine, and you take my place so sharply, I will give you my name."



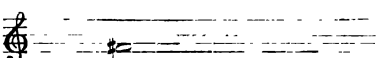
Little Goblin A♯

Very proud is the little goblin that he can really help the fairy; very happy is the fairy because she has so kind a friend. You and I will go to Fairy F's note on the fourth line in the Bass Road, and we shall find her little goblin hanging the small flag on the same fourth line. So, instead of pressing little F's white note, we shall go to the black note immediately above her on the right-hand side.



Little Goblin F♯

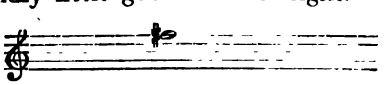
Now we will pay a visit to Fairy F's note between the first and second lines in the Treble Road, to find Goblin F-sharp on her right:



Little Goblin F♯

but, if you notice as quickly as I am sure you will, you will see that while he lives on the right-hand side, when the photograph is taken his banner appears on the left side. It is one of those funny things that happen in fairyland, and one which we must be wide awake enough never to forget.

Once again we must find Fairy F's note on the fifth line in the Treble Road, and, sure enough, there is the dear friendly little goblin on her right.

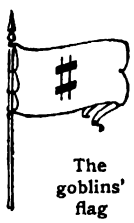


Little Goblin F♯

Wherever Fairy F has a home, there on the right is little Goblin F-sharp ready to sing for her, whenever she wants his bright little voice, but we must always remember that his voice is a little higher, or *sharper*, than the voice of the fairy he is representing.

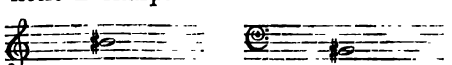
Has Fairy C a little C-sharp goblin, too? Certainly she has. We will find all the little notes belonging to her, and at the right-hand side of each one we shall see there is a wee goblin's house, and know that good, kind Goblin C-sharp is ready and waiting to help. Fairy G's little goblin lives exactly next door on her right; Fairy D is as happy as can be, because her goblin, D-sharp, is immediately next to her, and for the same reason Fairy A feels quite safe, knowing she can have a holiday when she wants one, for her little goblin, A-sharp, is ready to unfurl his banner and sing.

You will be surprized to know that Fairy B and Fairy E have no little goblin living immediately on their right. Look on the piano, and you will see that, as Fairy B's house joins Fairy C's, there is no room for a little black house, and Fairy E is in the same fix, for her house is the very next to Fairy F's, so what can these poor fairies do when they want a holiday?



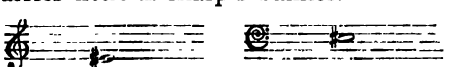
The goblins' flag

Well, as we know, in this magic land everyone tries to be kind to everyone else, and so Fairy C comes to poor little Fairy B, and says, "If you will give me the little sharp flag, and let me bear your name, I will quite forget myself as long as you need me, and during that time everyone will call me "little B-sharp."



Little Goblin B♯

The same kind offer was made to little E by Fairy F, and she, too, forgets herself, takes Fairy E's place, and carries little E-sharp's banner.

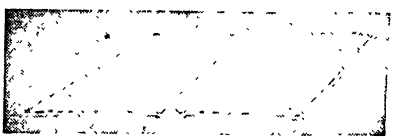


Little Goblin E♯

HOW TO DRAW AN OPEN BOOK

BY this time we know quite well how to draw easy things in black and white chalk. An open book is not an easy thing, but it is interesting, and we can learn now to draw it in chalk or in pencil—or with both if we like. We must have white drawing-paper and our pencils ready, in any case, because there are some things to learn for which we shall want to make some little pencil sketches first.

We have learnt how things alter their shape when they are moved nearer to or further from the eye, but there is still more for us to know about this. If we keep our heads quite straight, and our eyes too, and look at the wall exactly opposite us, there will be a point on the wall on a level with our eyes, and we can only see a small distance all round this point, so that some things on the wall are out of sight unless, of course, we turn our eyes towards them. This point on the eye-level is the point of sight. Do you remember how we found that the top of a jam-jar seemed to get wider as it was moved away from the eye-level, up or down?



The dotted lines show us how to begin the book. Then the other lines may be filled in.

We only drew the square box in another lesson in one position—exactly opposite to us; but we are going to draw the book a little way on the left, so that we can see the front and the right-hand edges. It will be easier to try this position with a sheet of white paper first. Take another piece of paper to draw upon, and use the blunt-pointed pencil.



The open book drawn in pencil.

Let us put the sheet of paper opposite to us first—that is easy to draw. The back line will be shorter than the front, so that the two other sides must slant. Lines like these below the eye slant upwards to the eye-level.

Now we will try with the paper on the right-hand side. We will draw the line nearest to us first, then the back line, shorter than the front; the little side lines slant upwards towards that point on the wall which is level with the eye. One side has further to go—the side furthest away from us—so it must slant more than the side nearest to us.

Why do we make slanting sides to a sheet of paper which has all its sides quite straight? It is because our eyes make them look slanting when the paper lies flat. If we made the lines all straight the paper would look as if it were standing on its edge.

Things opposite to us get smaller as they are pushed further off, and things on our right or left hand alter and get smaller, too, till they disappear quite out of sight. Now we will try to draw the sheet of paper on the left-hand side, and if we like we can make sheets of paper with white chalk on brown paper before we begin the book. Let us choose a good thick book, and one in which the pages will turn over easily and lie down when the book is opened. We will put it in front of us on the left-hand side, some distance away, and then with black and white chalk or pencil we will draw lightly and carefully the general shape of the part of the book lying on the table—not the thickness of the leaves or the binding yet; just a single outline as we drew the sheet of paper, only the centre of the book must be drawn, too. The side nearest to us will slant a little, the centre line will slant more, and the one furthest away will slant most. All these lines slanting upwards, they would meet in the point on the eye-level if we lengthened them so far.

If this part is nicely drawn the rest is easy. We can then put in the thickness of the binding and the leaves, showing this only in front and on one side—we cannot see the other side—and then try putting in the shadow softly with the flat side of the pencil point. If we make shadow we must not let the outline show, but make it all one color with the shadow. If we work in chalk we can put in the whiter part with white chalk, the darker with black, and the others with white used thinly.

LITTLE PICTURE-STORIES IN FRENCH

First line · French. Second line . English words. Third line As we say it in English.

La bonne dit à maman que Jeannette a besoin de bottines neuves.
The nurse says to mamma that Jenny has need of boots new.
Nurse tells mamma that Jenny needs new boots.
Maman lui dit de nous prendre au magasin pour en acheter.
Mamma to her says of us to take to the shop for of them to buy.
Mamma tells her to take us to the shop to buy them.
Nous sortons après le déjeuner. Nous sommes impatients de voir les magasins.
We set out after the lunch. We are impatient of to see the shops.
After lunch we set out. We are anxious to see the shops.

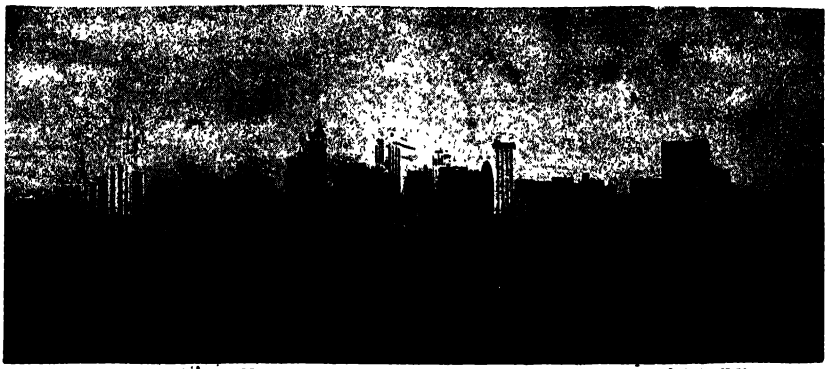


Nous entrons dans un magasin et la bonne dit : " Je désire voir des bottines."
We enter in a shop and the nurse says : " I desire to see some boots."
We go into a shop and nurse says : " I wish to see some boots."
Le commis nous en montre une paire, mais elles sont trop serrées.
The shopman to us of them shows a pair, but they are too tight.
The shopman shows us a pair, but they are too tight.
Le commis en apporte des autres et Jeannette tend son pied.
The shopman of them brings some others and Jenny tenders her foot.
The shopman brings some others and Jenny holds out her foot.
Tout à coup elle crie : " Regardez ! La petite souris ! " Elle a peur.
All at (a) blow she cries : " Regard ! The little mouse ! " She has fear.
Suddenly she cries out : " Look ! There is a little mouse ! " She is afraid.



La petite souris saute par-dessus la bottine et court derrière des boîtes.
The little mouse jumps by over the boot and runs behind some boxes.
The little mouse jumps over the boot and runs behind some boxes.
Nous éclatons de rire. Je pense que les filles sont très sottes.
We burst of to laugh. I think that the girls are very silly.
We burst out laughing. I think girls are very silly.
Enfin Jeannette choisit de jolies bottines, et la bonne paye la note.
At last Jenny chooses of pretty boots, and the nurse pays the bill.
At last Jenny chooses some pretty boots, and nurse pays the bill.

THE NEXT SCHOOL LESSONS BEGIN ON PAGE 2691.



The sky-line of New York, showing the height of some of its wonderful buildings.

THE UNITED NATION

PART I

WE told in our last story of the quarrels between President Johnson and Congress, and of the failure of the attempt to drive the president from his high office. As the end of his term drew near, it was certain that the Republican party would nominate General Grant for the presidency. This was done and he was elected by a great majority in 1868, and re-elected in 1872.



CONTINUED FROM 2160

Eight of the seceding states had been restored to the Union during Johnson's administration, but one of them, Georgia, had been put back under military rule. In 1870 this state and Virginia, Mississippi and Texas were all recognized as members of the Union. All the states were now in the Union, but conditions in some of the Southern states remained very bad for many years longer.

The Fifteenth Amendment, which forbade the states to deny negroes the right to vote, became a part of the Constitution during President Grant's first term, and some of the railroads across the continent were finished. Population in the West increased very rapidly as the railroads were pushed across the plains. In 1873, there came a period of hard times, during which many banks and manufacturing establishments failed, and business was very dull.

One of the most important events of the time was the Centennial Exposition at Philadelphia in 1876, to mark the century since the Declaration of Independence. It was the first of the great expositions held in the United States, and the exhibits from our own country and from Europe were finer than had ever been seen. People from all parts of the country attended, and saw many things of which they had only heard before.

A DISPUTED ELECTION CAUSES GREAT ALARM

At the election of 1876, both the Democratic candidate, Samuel J. Tilden, of New York, and the Republican, Rutherford B. Hayes, of Ohio, claimed to have been chosen. It was very hard to know who had been really elected. In one of the Southern states there were two governments, each claiming to be the right one. In other states there were many charges of fraud, and many laws had not been obeyed. The time for the new president to take

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office was coming and no one could say which of the two candidates was entitled to the office. So a special court, called an Electoral Commission, was formed, and decided in favor of Hayes, who took his seat, but many people believe to this day that Tilden was rightfully elected.

During this administration all United States soldiers were called back from the Southern states, which were allowed to govern themselves. As soon as the soldiers were gone, the "carpetbaggers" and negroes lost all power.

Though President Hayes was in many ways a good president, the charge that the office really did not belong to him had some effect on his popularity. In 1880, another Ohio man was chosen, though many people had tried to get a third Republican nomination of General Grant. The new president, James A. Garfield, had been a poor boy who had struggled hard for an education. Once he drove the teams which pulled the boats on the Ohio Canal, and afterward worked his way through school and college.

President Garfield had been in office only a few months when he was shot by a man who had become half-insane because of disappointment at not receiving an office. Vice-President Chester A. Arthur, of New York, became president and served the remainder of the term. He was a good president and the country was very prosperous while he was in office.

THE FIRST DEMOCRATIC PRESIDENT SINCE THE WAR

At the election in 1884, Grover Cleveland, then Governor of New York, was chosen. President Cleveland was a Democrat and was the first president of that party since James Buchanan. For twenty-four years every president had been a Republican. But the Democratic party did not have entire control of the government, as during the four years a majority of the senators were Republicans. During this term there were great strikes in different parts of the country. A "strike" is the refusal of men to work longer for their employer. The railway strike in Chicago was so serious that President Cleveland called out United States soldiers to protect lives and property.

After the end of the Civil War, the wooden ships of the navy had been allowed to rot, and the monitors, as the iron ships were called after the first one, had rusted away. The country had no navy worth mentioning when Cleveland became president. During his term we began to build modern warships and have continued until now our navy is one of the strongest in the world.

Mr. Cleveland was again a candidate in 1888, but was defeated by Benjamin Harrison, of Indiana, a grandson of President William Henry Harrison. The tariff was greatly increased during his administration and six states were admitted to the Union. There was much talk about coining more silver into dollars, and a law was passed which allowed this.

Though President Harrison was a man of great ability, he did not make friends easily and was not very popular with his own party. He was a candidate for re-election in 1892, but Cleveland was again elected. He is the only president in our history who has served two terms not in succession.

A GREAT EXPOSITION HELD IN CHICAGO

A celebration of the four hundredth year since the discovery of America by Columbus took place in Chicago in 1893, as the buildings could not be gotten ready in 1892. This World's Fair, as it was called, was the most wonderful collection of the manufactures and products of the world that had ever been seen.

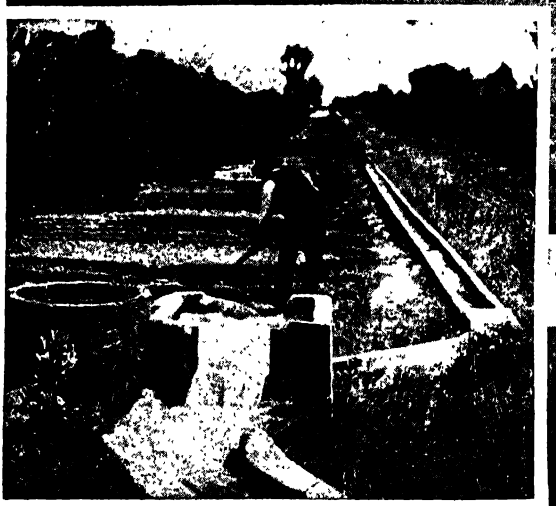
Times were very bad during President Cleveland's second term, and there were many strikes. The farmers in the South and West thought that the laws were more favorable to the manufacturers than to those who worked on the land, and demanded many new laws. His own party did not support President Cleveland, and nominated William J. Bryan, of Nebraska, and he received the support of the farmers' party also.

When the election arrived the Republican candidate, William McKinley, another Ohio man, was chosen. The most important event of his administration was the Spanish War, of which you are told in another volume. President McKinley was re-elected in 1900, but only a few months after his second term began, he was shot by an anarchist, while in Buffalo, New York, attending another exposition, and soon died.

The vice-president, Theodore Roosevelt, became president and finished the term, and was himself elected for a full

MAKING THE DESERT BLOSSOM AS THE ROSE







Here we see the wonderful results of the energy of the people of the great West. In their advance across a vast continent they came to arid deserts like that in the top picture, on which rain rarely falls. They set to work, however, bored wells, and dug waterways to fetch water from the distant mountains and rivers. This water they guided into a vast network of irrigation channels, and made the desert soil so fertile that to-day, after forty years, we see such luxuriant orange-groves as in the bottom picture. In the centre picture we see water flowing from a well into an irrigation channel, and so the want of rain does not matter at all to these busy people. Photos copyrighted by Underwood & Underwood, N. Y.

term in 1904. Mr. Roosevelt was one of the most active presidents the country has ever had. He started the work on the Panama Canal, had a pure food and drug law passed, and did much to bring water to the dry lands in the West. Through his influence Japan and Russia agreed to stop fighting. When the Cubans began to quarrel among themselves he sent an army to preserve order. He visited all parts of the country to make speeches, went to see how the work was being done on the Panama Canal, and took great interest in everything. At the end of his term he spent more than a year hunting in Africa and told of his adventures in a large book.

OHIO THE NEW "MOTHER OF THE PRESIDENTS"

Mr. Roosevelt was succeeded by William H. Taft, of Ohio. That state seems to be likely to take away the title, "Mother of the Presidents," from Virginia, as so many of our recent presidents have been elected from Ohio. Mr. Taft had had much experience in government. He was the first governor of the Philippines, served as Secretary of War, and when the United States sent the second army to Cuba, took charge of the government until the island was quiet again.

President Taft did not have a happy time as president. The Republican party was divided on the tariff, and other questions, and the President could not please either side. When Ex-President Roosevelt came back from Africa he began to take great interest in politics and tried to get the Republican nomination in 1912. He failed and his friends organized the new Progressive party and nominated him for president. The old friends now opposed each other and divided the Republican party so that the Democratic candidate was chosen.

THE UNITED STATES IN OUR OWN DAY

In the election, Woodrow Wilson, Governor of New Jersey, was chosen, and was inaugurated March 4, 1913. President Wilson had been a college professor, and was president of Princeton University when chosen governor of New Jersey. Like President Cleveland he had had very little political experience, but congress passed many bills he recommended.

During President Wilson's first term, for he was re-elected in 1916, a new tariff bill was passed, and many changes were made in the laws about money and banking. The Panama Canal was completed and we almost had a war with Mexico as that country was in a state of revolution and American citizens were abused and even killed.

The Great War in Europe broke out and though President Wilson succeeded in keeping the United States out of the conflict for more than two years, war was declared against the German Empire, April 6, 1917, and later against the Austrian Empire. During this year three small islands in the West Indies, St. Thomas, St. Croix and St. John, were bought from Denmark for $25,000,000.

Many men were called to enter the army and navy, and very soon uniforms were seen in every town and city. Real cities were built to shelter the soldiers while they were drilling before going across the ocean. American naval vessels soon went across the water to hunt submarines, or to guard the ships carrying soldiers or food and military supplies. Two million men went across the ocean, and as many more were ready to go when the Germans asked for peace in 1918.

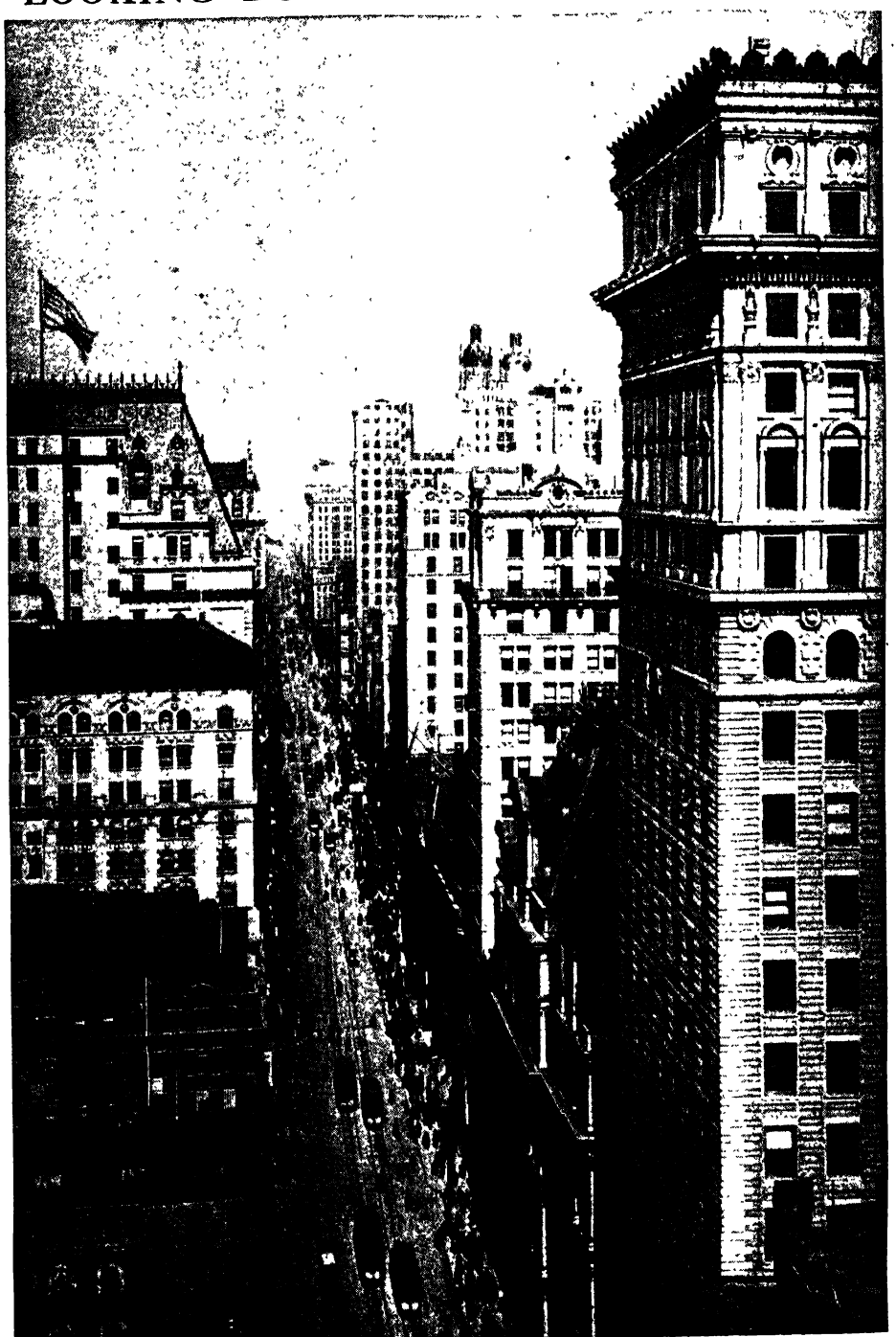
President Wilson was a strong advocate of a League of Nations and attended the Peace Conference in Paris to work for the idea. Many men in the United States were opposed, and the President's ill health caused some confusion. At the election in 1920 the Republican candidate, Senator Warren G. Harding, was chosen the twenty-eighth President by a large majority.

The United States is really growing into middle age. Whether the United States will grow any larger no one can say. Years ago many people in both countries thought that Canada would some day be joined to the United States, but little is heard of the idea now. Some have dreamed of extending the country down to the Panama Canal, but most of the citizens think that the plan would be very unwise.

VICE-PRESIDENTS WHO SUCCEEDED TO THE OFFICE OF PRESIDENT

Though twenty-eight men have been president, only twenty-four were elected to the office. Five vice-presidents have become presidents because of the death of the man elected. These were John Tyler, who succeeded William Henry

LOOKING DOWN A NEW YORK STREET



New York, chief port of the United States, is built on a narrow island. This means that as the city grew there was not as much room as people needed for building. So, instead of spreading buildings over the ground, they have been built high in the air, until the business part of New York is now largely a city of "skyscrapers," as we usually call them. Broadway, shown in this picture, is one of the principal streets in New York, and is like no other street in the world. A great part of it is like a deep ravine, lined on each side with buildings from ten to more than thirty stories high, and at some points the sun seldom reaches the level of the street.

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Harrison after only one month of the term had gone; Millard Fillmore, who succeeded General Tayler; Andrew Johnson, who filled out the greater part of Lincoln's second term; Chester A. Arthur, who succeeded Garfield; and Theodore Roosevelt, who served nearly three and a half years of McKinley's second term. Mr Roosevelt is the only one of these five who was himself afterward elected for a term as president.

One fact which we must consider with shame is that three of our presidents were assassinated within forty years. It seems horrible that such a thing should occur in a free country, where every one has a voice in the government, and where there is no chance of a president becoming a tyrant.

Of all our presidents ten have been twice elected, though Lincoln and McKinley did not fill out their second terms. Cleveland was elected, then defeated, and then elected again.

WHERE OUR PRESIDENTS LIVED

All of our presidents were born east of the Mississippi River and most of them have come from a few states. Five came from Virginia. These were Washington, Jefferson, Madison, Monroe and Tyler, but three others, William Henry Harrison, Zachary Taylor, and Woodrow Wilson, were born there. Ohio has furnished six, W. H. Harrison, Hayes, Garfield, McKinley, Taft and Harding. All these except W. H. Harrison were born in the state, and Grant, and Benjamin Harrison, though elected from other states were born in Ohio. Five lived in New York, Van Buren, Fillmore, Arthur, Cleveland and Roosevelt, but Arthur was born in Vermont and Cleveland in New Jersey. Three lived in Tennessee, Jackson, Polk and Johnson, but all of them were born in North Carolina. Massachusetts has had two, John Adams and John Quincy Adams, father and son. Illinois has had two, Lincoln and Grant, but Lincoln was born in Kentucky and Grant, as we said above, in Ohio; Louisiana had one, Taylor; New Hampshire had Pierce, and Pennsylvania had Buchanan. Indiana was the home of Benjamin Harrison and New Jersey of Woodrow Wilson.

The West is growing so rapidly in population, wealth and influence, that before many years we may expect to see a president elected from the region beyond the Mississippi, and perhaps one from west of the Rocky Mountains.

SOME FACTS ABOUT THIS COUNTRY OF OURS

We have now told something of the story of our country. Now let us look about us and learn something of the country itself, the people, and the products of the country. We know that the population is very great, and we shall try to find out where the people live and how they make their livings.

Not counting our foreign possessions the United States proper extends over more than 3,000,000 square miles. This means that the United States is larger than all the countries of Europe taken together except Russia. Several single states are larger than most of the countries of Europe and Texas is larger than any of them except Russia.

In addition we must count Alaska, nearly 591,000 square miles, the Philippines with 120,000, Hawaii, 6,449, Porto Rico, 3,435, and many smaller islands in many seas. In all, the outlying territory of the United States amounts to about 725,000 square miles. We have already told you of this in another place and shall not say more about it now.

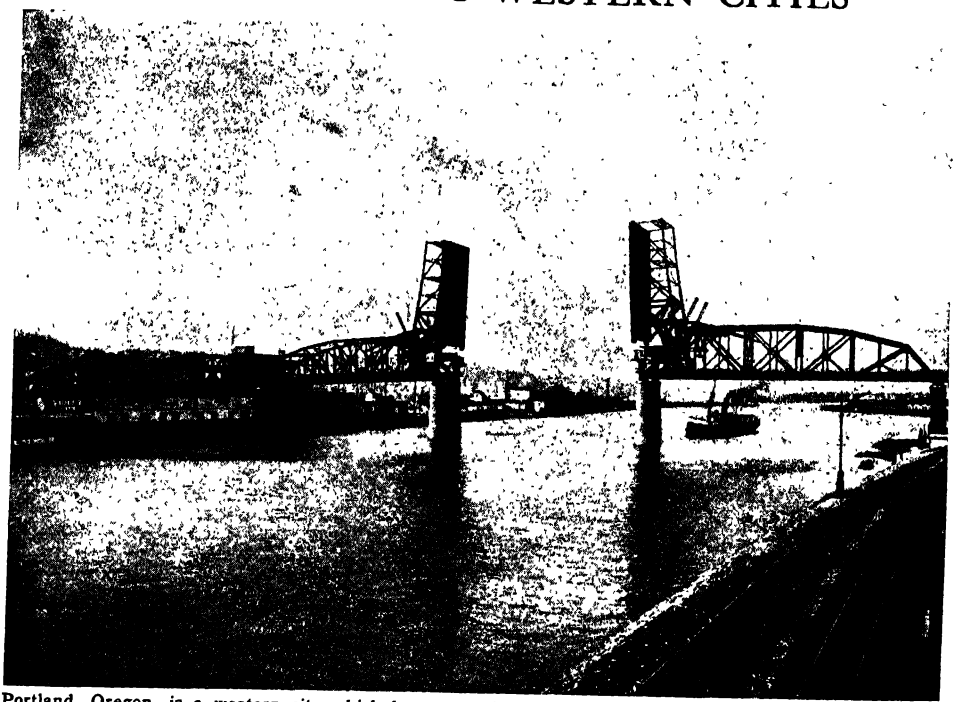
Every ten years the government takes the census. The number, residences, and occupations of the people, their religion, the kinds of property they own, the crops they have raised, the goods they have made, and many other things are all put down and afterwards published in large volumes. From them we can learn many interesting things, for figures are not dull if we understand what they mean.

WHAT THE CENSUS SHOWS OF THE GROWTH OF OUR COUNTRY

The census of 1920 showed that there were in the United States proper, on January 1st of that year, more than one hundred and five and a half million people living. If to these we add the population of Alaska and our island possessions, the number goes beyond 117,000,000. The first census was taken in 1790, a hundred and thirty years before that of 1920. Then the population was about 4,000,000. This shows a wonderful growth.

The state with the largest population is, as might be supposed, New York, which had 10,384,829, a larger number than many nations have. Pennsylvania is next with 8,720,017, an increase of over

TWO THRIVING WESTERN CITIES



Portland, Oregon, is a western city which has grown like magic. It is beautifully located at the point where the Willamette River joins the Columbia. It has an excellent harbor which will accommodate the large ships that come to take away some of the many things manufactured in the busy city. The railroad connections are excellent. This is the Broadway bridge over the Willamette, raised to let a ship pass.



The city of Reno, Nevada, is situated on the Truckee River and is the largest town in the state. It is the educational, business, and industrial centre of the state. The University of Nevada is here, and several other schools. There is considerable manufacturing and the country around is rich in minerals. Much of the land is irrigated and produces large crops. Many cattle are also raised. It has several railroads.

a million. The state with the smallest population is Nevada, which had only 81,875 people in 1910, and ten years later only 77,407. This state ought not to have been admitted when it was because of its scanty population. Much land in this state is not suitable for agriculture, but irrigation is making much of it fertile and the state may yet support a large population.

The largest city is New York, with 4,800,000 people in 1910, and 5,620,000 in 1920, which makes it the largest city under one government in the world. Chicago has now over 2,700,000, and Philadelphia, with more than 1,800,000, ranks next in size, and these three are among the ten largest cities in the world.

VARIETIES OF SOIL AND CLIMATE IN THE UNITED STATES

Within the United States is almost every kind of soil and climate. On the rocky hillsides in Maine and New Hampshire very small crops are raised, while the broad prairies of the Mississippi Valley, and the lowlands along the seacoast and rivers, have some of the richest land in the world. Somewhere in the vast extent is soil which suits almost every crop.

In the most northern sections, the winters are long and the summers short, and only the crops which grow very rapidly can be raised. In the far South, in Florida, Louisiana, Texas and Southern California, it seems always summer. In some parts of the country, there is almost constant rain at some times in the year. In other parts rain seldom falls.

There are real deserts to be found, though they produce good crops when water is furnished. In other parts much land has been reclaimed from the sea or from the rivers, just as we know has been done in Holland and Belgium. Much land along the lower part of the Mississippi, and the rivers which flow into it, is lower than the river, and great banks of earth called levees keep the water back from the land.

CORN, THE MOST VALUABLE CROP WE RAISE

Corn is the most valuable crop produced in the United States. We grow three-fourths of the world's supply of this wonderful grain, which is so valuable for human food, as well as for horses, cattle and hogs. The dry stalks also make valuable food for horses and cattle. While still green the stalks and leaves are often chopped into short pieces and packed tightly in a great tank called a silo. The moisture does not dry out of the pieces, and animals like this ensilage, or silage, as it is often called, much better than the dry. There is no more beautiful sight than a great field of waving corn.

Corn will grow in nearly every part of the United States, but the states of the Middle West grow most, though the largest crop ever grown upon a single acre was produced by a member of a Boys' Corn Club in South Carolina. Many boys in the United States are members of such clubs, and try to raise as many bushels as possible.

The next crop in value in most years is hay, though little of this is sent abroad. Many grasses are dried to make this crop. Some grow wild without care and what is gained from them is almost entirely profit. In other sections the seed is sown though not every year. Several kinds of clover, timothy, red top, orchard grass, blue grass and alfalfa, are some of the plants used for hay. The vines of several sorts of peas and beans make good hay when cured properly.

COTTON, A CROP WHICH THE WORLD MUST HAVE

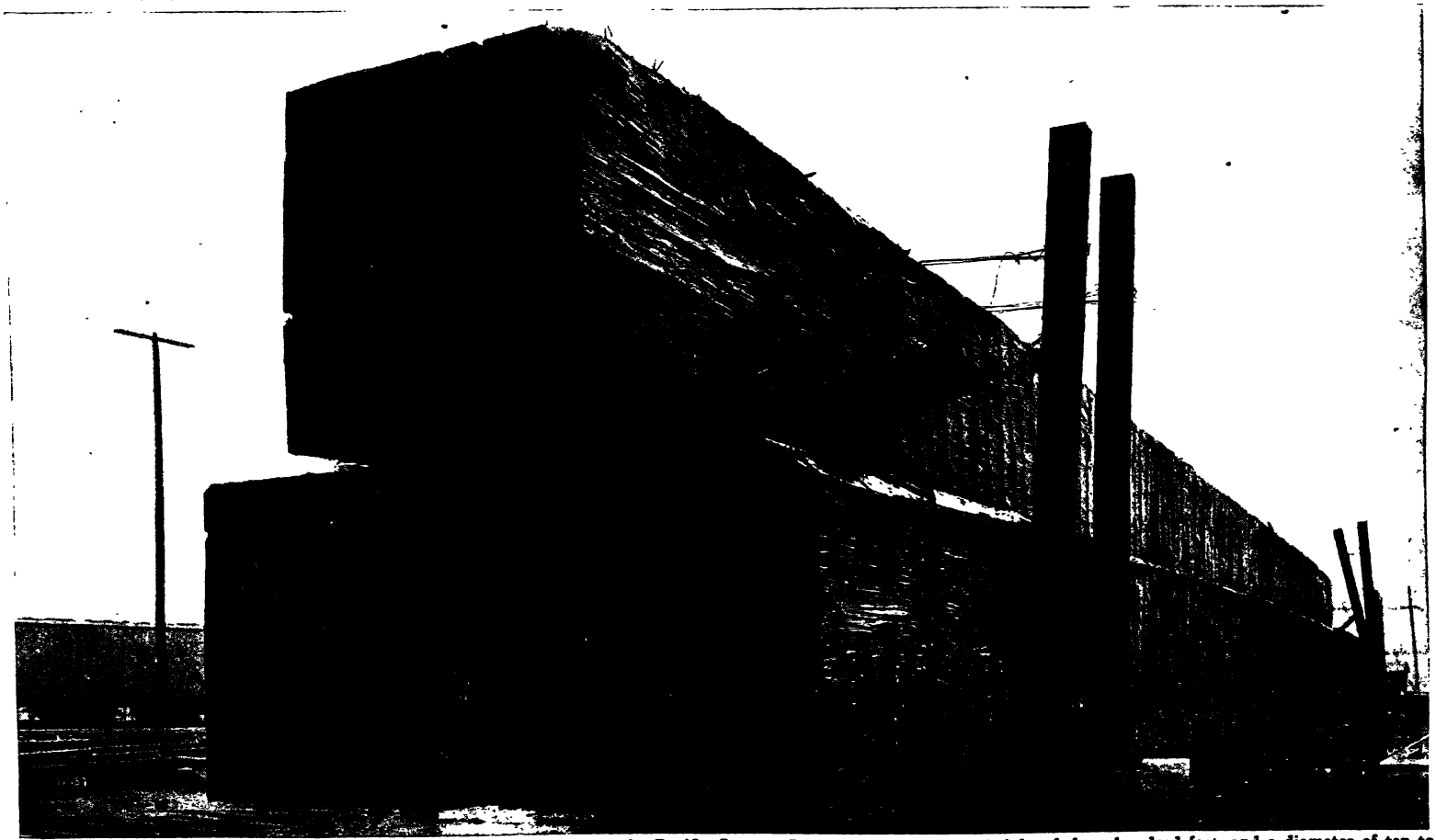
The crop for which the world is most dependent upon us is cotton. In no other country can cotton be grown so easily as in our Southern states, and though we have many busy factories, both in the North and in the South, much more than half of the crop is sent abroad. Egypt and India grow cotton also, but there is not land enough in Egypt, and in India the climate does not allow the best kinds to grow. If a machine to pick the cotton in the fields could be invented, the United States could easily supply the whole world.

Other nations have tried to develop cotton growing in different parts of South America, Asia and Africa, but have not succeeded very well. Soil, climate and labor must all be suited to the plant, and all these are seldom found together. The United States will be the chief cotton-growing country for a long time. The sea island cotton, which has very long fibres, which are almost as fine as silk, is grown only in the United States.

MILLIONS OF DOLLARS ONCE THROWN AWAY

Only a few years ago the seeds of the cotton were considered a great nuisance

LOGS OF THE DOUGLAS FIR ON THE WAY TO THE MILL



The Douglas fir, or Douglas spruce, is one of the most valuable trees on the Pacific Coast. It sometimes reaches a height of three hundred feet, and a diameter of ten to twelve feet. The timber has a straight grain and is very strong. Many trees are cut every year. Here you see some of the logs on railway cars on the way to the mills.

and were thrown away. Now they are ground, the oil is pressed out, and what is left is used for a fertilizer or for food for cattle. The hulls also are fed to cattle. The oil is used for many purposes, and some dishonest dealers put false labels on the bottles and sell them as olive oil. Altogether the value of the products of the cotton seed, once thrown away, amount to more than $150,000,000 a year.

Our next crop in value is wheat, of which we usually grow about a fifth of all grown in the world. Some wheat is grown in most of the states, but it is in the newer states of the Gulf Slope, of which you were told in the first volume, that the largest fields are to be found. We have been using over four-fifths of our crop ourselves, and sending the remainder to help feed hungry Europe, but if our population continues to increase so rapidly, we shall not have much to spare before many more years have gone. Great wheat fields are being developed in Canada and in the Argentine Republic, however, and so America will continue to be the granary of the world for a long time.

The United States grows more than any other single country because so much land is devoted to wheat. The European countries generally grow more bushels to an acre, but they cannot plant so many acres. In some states wheat is sown in the fall and is ripe in the early summer. In other states it is sown in the spring and is reaped in the late summer or early fall. North Dakota, Minnesota and Kansas, in the order named, usually grow the most wheat, but several other states are not far behind.

OTHER IMPORTANT CROPS GROWN IN OUR COUNTRY

Our next important crop is oats, of which we grow a great quantity. Perhaps you have oatmeal for breakfast every morning, but the horses get much more than we do.

The next crop is also one not much of which is sent abroad. This is the white or Irish potato, and the crop is worth millions of dollars a year. We also grow great quantities of sweet potatoes, but they are nearly all eaten in this country. The white potato is chiefly grown in Northern states and the sweet potato in the South.

The next crop in value is one with which boys and girls have nothing to do. This is tobacco, of which we grow more than a third of the world's supply. Some of the factories which prepare this plant are very large and employ thousands of men, women and children. This is a luxury, but it is one men will go without many necessities to gain.

Next we come to sugar. We use more than any other people of this, one student says, eighty-five pounds a year for every man, woman and child. We cannot begin to raise all we need, though we grow sugar-cane in the South, sugar-beets further north, and get a little maple sugar from several states. We get much sugar from Cuba, Hawaii, and usually get some from Europe.

These are only a few of the crops we raise, but they are the principal ones. We raise in the Southern states almost all the rice we use and the amount of flax raised for its seeds is large. Linseed oil, used in painting, is made from flax seeds. We grow rye, barley, buckwheat and many kinds of fruit and vegetables. In California and Florida, oranges, pineapples and other tropical fruits are grown, while apples, peaches and pears grow in many parts of the country. We are beginning to send some of our fruits abroad, as it is possible, by packing them in ice, to deliver them in good order, thousands of miles away. California leads in the value of its fruits, with New York next. Michigan and Pennsylvania also grow large quantities. Florida is second to California in tropical fruits.

ONE IMPORTANT CROP WHICH WE ALMOST OMITTED

There is another crop which we must mention. Probably you have never considered it a crop at all, but it is as truly a crop as hay. The chief difference is that it takes longer to grow. The crop is trees, and the product is wood or lumber. Land will yield a crop of hay every year, or perhaps several crops. A crop of trees takes twenty, forty, a hundred years to grow. Both hay and trees grow wild, and both are also cultivated.

When our ancestors came to this country, much of it was covered with trees. The earliest descriptions and pictures of Manhattan Island show us that it was once covered with a great forest. So was most of New England and the whole Atlantic Slope in fact. A part of the Mississippi Valley had no trees, but was covered with waving grass. This is the

prairie region, of which you have heard, and there are more trees in it now than there were a hundred years ago. There were, however, great forests about the Great Lakes, in the Rocky Mountains, and on the Pacific Coast.

In another place we shall tell you how these great forests were cut down and how much of the wood was wasted, because people thought there was enough to last for ever. We are even now cutting down our trees more than three times as fast as they grow, and soon they will be gone unless men plant trees in great numbers. Think what uses we make of trees and their products, and you will see how difficult it will be to find something to take the place of wood.

We use wood to burn, to build houses, for furniture, for railway ties, for bridges, for boxes, pails and other containers, for vehicles. In fact we cannot name all the things that are made of wood. The trees from thousands of acres are required by the paper mills alone every year.

The value of the timber products of the state of Washington is greater than that of any other state. New York stands second and Louisiana third. A few years ago Michigan and Wisconsin led in this product, but so much was recklessly cut away that these states ranked fourth and fifth in 1910. In Washington much spruce is cut, and the Douglas spruce or Douglas fir furnishes some wonderful logs.



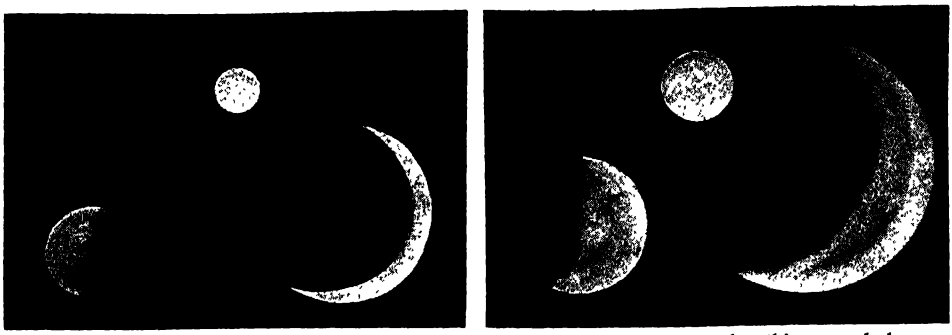
The apples grown in the valley of the Hood River, in Oregon, have made the district known everywhere. This is an apple orchard in full bloom and is a sight worth going miles to see. Delicious pears and strawberries are also grown. A ring of mountains surrounds the little valley, and Mt. Hood is not far away.

Much hard wood is cut in the Southern mountains, and much pine in the low country, and Louisiana furnishes much cypress.

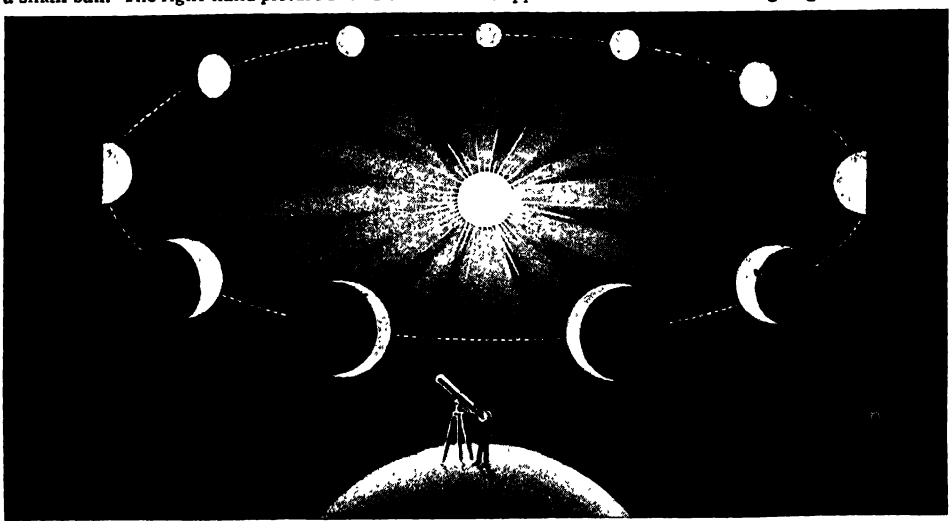
In our next article we shall tell you more about this wonderful country of ours. In it we shall speak of the mineral products and of the manufactures which are so important. As you see, we have been telling you only of the things which grow out of the ground and are called vegetable products. We shall also tell you something of the people who now live in the United States.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 2677.

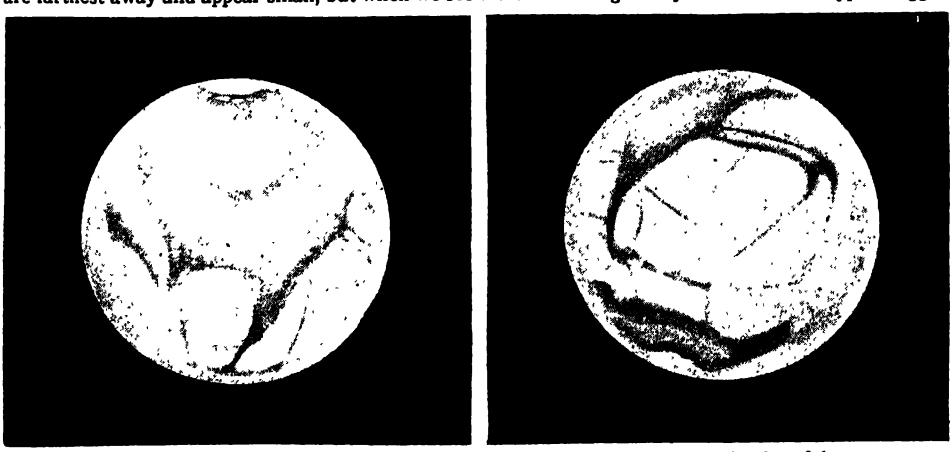
OTHER WORLDS AS SEEN FROM THE EARTH



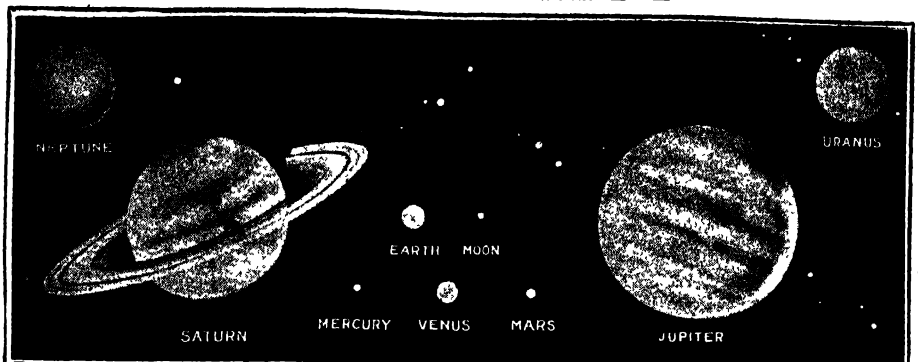
Like the moon, Mercury and Venus are always changing their appearance to us, but this can only be seen through a telescope. The left-hand picture shows Mercury. It looks like a crescent when nearest the earth, and as more of it comes into our view it gets smaller, until we see the whole planet at its farthest distance as a small ball. The right-hand picture shows the different appearances of Venus as seen going round the sun.



Mercury and Venus are nearer to the sun than we are, and this picture shows how they appear to us from the earth, and why at different times their shape varies. When the sun shines full on the side we see, the planets are farthest away and appear small, but when we see a crescent of light they are nearer and appear bigger.



Some astronomers think they can see double canals on Mars, while others say this is a false appearance caused by the telescope, and that the canals are single. In the left-hand picture the canals are shown double, and at the top is the South Pole of Mars, white with ice. The dark funnel-shaped part is thought by some to be sea. The right-hand picture shows the same half of Mars tilted up more, showing the North Pole, which is the white patch at the bottom. Here the canals are shown single, as many astronomers think they are.



These pictures show the earth and the other planets that move round the sun in space, They are shown here in their comparative sizes; Jupiter is twelve hundred times as big as the earth.

THE SUN'S FAMILY OF WORLDS

CONTINUED FROM 2297



WE must now study the other planets of the solar system. There is now probably no doubt that the innermost planet is Mercury, and that a planet going round the sun still closer than Mercury does not really exist, though some astronomers have thought that they had seen it. It may be that in the future astronomers may discover that those were right who thought they saw the planet which they called Vulcan; but for us, at any rate, the innermost planet is Mercury. Its discovery goes back a very long way. Indeed, though Mercury is by no means easy to see, and though such a mighty astronomer as Copernicus, for instance, never saw it, yet we know that, so far back as the records of astronomy go at all, Mercury was already known.

If we little people are more fortunate than Copernicus, and get a view of Mercury, we shall probably see the planet as a crescent, or, at any rate, as very like one or other appearance of the moon. This, we understand at once, must be the case with both Mercury and Venus, as these are planets very like the earth or the moon or Mars, in that none of them can shine of themselves, but can only reflect the sun's light. As Mercury goes round the sun, one half of the planet is always lit up by the sun's light, and what we see of Mercury or Venus, as in the case of the moon, entirely depends upon how much we can see of the half of the planet that is turned towards the sun. I am afraid we know really nothing yet as to what the surface of Mercury is like. This is not due so much to the fact that Mercury is small, as to the fact that it is so bright—because, of course, it is very near the sun. Indeed, Mercury is so bright that with the naked eye we cannot see its shape at all, and even through the telescope it glitters too much for us to make out any features of its surface. The temperature of Mercury must, however, be so hot that nothing at all like life, as we know it, can be possible there *yet;* and so it matters little that we know nothing about Mercury's surface.

We do know, however, certain very interesting facts about Mercury. The planet is not very large, but is larger than the moon. It is very easy to remember that the diameter of Mercury is just under 3,000 miles. It has also been shown that the planet is very heavy in proportion to its size; or, in other words, it is very dense. The density of Mercury is considerably greater than that of the earth, and it is the densest of all

the planets. The year of Mercury is just about 88 of our days; or we may say that Mercury goes right round the sun in what we call about three months.

We know that all the planets move round the sun, not in circles, but in the kind of path which is called an ellipse. This is true of all the planets, and it depends upon the law of gravitation. But as a rule the path of a planet, though an ellipse, is so very nearly a circle that we might almost call it a circle unless we studied it very carefully.

THE PLANET MERCURY, WHERE THE YEAR IS ONLY THREE MONTHS LONG

Mercury, however, is peculiar because its path is very much more elliptical, or more this shape, ⬭, than that of any of the other planets, including, of course, the earth. The average distance, or, as astronomers say, the *mean* distance, of Mercury from the sun is about 35,000,000 miles, but its path is so elliptical that the least distance of the planet from the sun is only about 28,500,000 miles, and its greatest over 43,000,000. Mercury is very near the sun in any case, and so must always be very hot. But these differences of distance are so great, and succeed each other so quickly—for the planet's year is only three months—that it is impossible to imagine how any kind of life could endure there.

We are now able to say that the planet has an atmosphere, and perhaps a very dense one. It probably rotates upon its axis, and there is some reason to believe that this rotation takes just as long as the planet takes to go round the sun, thus offering something very similar to what we saw in the case of the moon.

It is not possible to learn much about the composition of Mercury, for the light we see it by is only sunlight, reflected from its atmosphere, and tells us little. But there is not much doubt that Mercury has water in its atmosphere; we believe that it has no moon.

THE BRIGHT WORLD THAT TRAVELS BETWEEN MERCURY AND OURSELVES

The planet Venus travels between Mercury and ourselves, and so this planet also appears to us in phases like the moon and Mercury. The planet is much larger than Mercury, its diameter being not very much less than that of the earth, say, 7,760 miles as compared with nearly 8,000. The nearness of the planet to the sun—its average distance is about 66,000,000 miles—gives it its great brilliance—brilliance entirely due to sunlight, of course. Venus is brighter than Jupiter, though Jupiter is vastly larger, and gives out some light of his own besides reflecting sunlight. But when we make these comparisons we are always thinking of how things look from the earth. We should remember, then, that Jupiter is millions of miles farther from the earth than Venus is. Just as we may learn from the brightness of the sun, which is not by any means a very big star, or from the brightness of the moon, which is really but a grain in the heavens compared with any star—so we may learn from the brightness of Venus that it is *nearness* which gives a thing value in our eyes; and that it is the business of our *minds'* eyes to find out which things are really the brightest and biggest, and which things are really the most important for the universe and in the universe—whether they be near to us or far from us.

THE STAR THAT CAN SOMETIMES BE SEEN IN DAYLIGHT

Leaving the sun and moon out of account, Venus is queen of the heavens as we see them—brighter not only than Jupiter, but also than the brightest of the stars.

When Venus is at its brightest, it can be seen by the naked eye in daylight, and that cannot be said either of Jupiter or of Sirius, which is the brightest of the stars as we see them. This intense brightness is entirely due, we know, to reflected sunlight, for the part of the planet on which at any time the sun's light does not fall is just as dark as we see in the case of the moon. The discovery of the *phases* of Venus, by which we mean the forms which she assumes at different times, was made by Galileo, as we read elsewhere.

We know scarcely anything about the surface of Venus, though we have evidence that the planet has an atmosphere. The mean distance of Venus from the sun is about 66,000,000 miles, and though its path must, of course, be a true ellipse, it is more nearly a circle than in the case of any of the other planets. The year of Venus is about 224 of our days. It is very likely that, as in the case of Mercury's movement

round the sun and the moon's movement round the earth, Venus spins on herself in the same time as she takes to go round the sun. Like Mercury, Venus has no moon, or satellite.

WHERE WE SHOULD MEET THE EARTH IF WE WERE TRAVELING FROM THE SUN

If we were traveling outwards from the sun, and studying the planets as we came to them, we should next meet a body very like Venus in some ways; indeed, hardly different from Venus in size. The mean distance of this body from the sun is rather less than 93,000,000 miles; its year is about 365¼ days, but its day, instead of being as long as its year—as we have seen in the case of the first two planets—is very much shorter, being just under twenty-four hours. This planet, unlike the two we have discussed, possesses one moon. What name the inhabitants of Mars apply to it—if there are any inhabitants of Mars—we do not know, but that group of its inhabitants who speak the language in which this book is written call it *the Earth*.

Traveling farther outwards, we come to the wonderful planet Mars. In the case of Mars, as in that of all the planets farther from the sun than the earth is, of course we do not see phases as we do in the case of the moon, Mercury, and Venus. But even the crescent of Venus is brighter than Mars, except, perhaps, at certain times, even though we always see the whole of the lighted half of Mars. The planet is reddish in color, thus suggesting blood, which suggests war, and this led to naming the planet after the god of war. Mars certainly gives out no light of its own, any more than Mercury, Venus, the earth, or the moon do. There must be something on its surface which gives the red tint to the sunlight which it reflects. It is probable that the planet is largely covered by great stretches of sand, which would explain its reddish color.

HOW MARS COMES AT TIMES VERY NEAR TO THE EARTH

Mars, of course, moves round the sun in an ellipse. This ellipse is very much farther from being a circle than in the case of the earth's orbit. Indeed, only Mercury has a more elliptical path than that of Mars. Kepler's great discovery of the movements of the planets and their laws largely depended upon watching the orbit of Mars, and it was Kepler's studies from which Newton, in his turn, discovered the law of gravitation.

Now, as the earth travels round the sun in what is very nearly a circle, while Mars travels in what we might call a rather oval path, outside the path of the earth, it follows that the distance between Mars and the earth varies a good deal. The year of Mars amounts to about 686 of our days, and so it is at regular intervals of years, as we call them, that Mars and the earth come nearest to each other. At the most favorable times Mars and the earth may be only 35,000,000 miles apart. If you draw a little picture for yourself, showing the sun, with the earth going round it, and Mars, farther away, also going round it, and if you remember that the earth is going round much more quickly than Mars, you will see that times must constantly return when the earth, rushing round, comes to lie just between the sun and Mars. When the sun, the earth, and Mars are in the same straight line, that is called the *opposition* of Mars—for, from the earth's point of view, the sun is on one side and Mars on the other, the two being opposed, or *opposite*, to each other.

THE GREAT QUESTION WHETHER THERE IS LIFE ON MARS

Of course, if Mars and the earth both moved in circles, the two planets would be equally near to each other at every opposition. But as the two paths are not of the same shape, that is not so. The two planets were very near each other at the opposition of 1892, and also in 1877, when the two moons of Mars were discovered.

The next favorable opposition was in the year 1909, when astronomers were expecting to learn, with their splendid new telescopes and instruments for studying light, much more about Mars than we have ever learnt before. The great question about Mars is whether it is inhabited by intelligent beings, and though I should like to spend a lot of time in discussing that question, I think it is better not to do so, just because we have learnt much more about the planet recently. One thing, however, we must learn, and that is the great fruit of knowledge gained from the two oppositions, which have added much to our knowledge though not so much as

we hoped. We have learnt, beyond all doubt, that there is water upon Mars, and we do not need to remind ourselves how important that is in its bearing on the question whether life of any kind can exist on the planet.

IS THE SURFACE OF MARS LIKE THE SURFACE OF THE EARTH WILL BE?

The average distance of Mars from the sun is 140,000,000 miles. The least and the greatest distances are 128,000,000 and 155,000,000 miles, a great difference, which shows us how far from circular the planet's path is—because, of course, if it went round the sun in a circle Mars would always be at the same distance from the sun. We have already seen the length of the year of Mars, which is 686 of our days. The diameter of the planet is about 4,200 miles. This is only little more than half the diameter of the earth.

The size of Mars largely explains, as in the case of the moon, the fact that the history of the planet has been a quicker one than that of the earth, and so we believe that the surface of Mars represents in many respects what the surface of the earth will be like in some distant age. The two things we specially note are, first, that the outside of the planet seems to have lost the greater part of its water; and, second, that the ages have worn its surface down to a great smoothness, just in the fashion which we seem to see going on in the case of the earth. If you ask why the moon has not been worn smooth in the same way, the answer is that the moon has no water or atmosphere to do the work. Mars has both.

HOW THE CAMERA IS DISCOVERING ANOTHER WORLD FOR US

Fortunately for us, Mars spins upon itself, not as Mercury and Venus do, nor as the moon does in relation to the earth, but at a rate quite different from its movement round the sun. This means, of course, that we are able to see all sides of Mars. It is, indeed, an amazing thing that we can see and study and map both Poles of Mars, though no human eye has ever seen some parts of the earth. The day of Mars is only about half an hour longer than the day of the earth; in other words, the planet spins completely round on its axis in rather more than twenty-four and a half hours.

The surface of Mars is largely covered with markings which look as if they had been made on purpose. For many years people said that these markings were only imagined, but they have now been photographed. Some people think that they are what they seem to be—canals made by intelligent beings and carrying water; but before we form an opinion on this we ought to wait for much more knowledge. Only please remember one thing. The digging of a canal on Mars would be very much easier work than digging a canal of the same size on the earth, because the planet's mass is so much less than that of the earth, and in consequence it would offer less resistance to lifting out the material when digging the canal. We must just remind ourselves that Mars has two moons, and that the inner one travels round Mars about three times a day. It is possible to say "three times a day," because the earth's day and the day of Mars are just about the same.

A WONDERFUL GROUP OF LITTLE WORLDS LIT UP BY THE SUN

If we travel outwards from Mars, we encounter a large number of small planets, usually called the minor—which means lesser—planets, that travel in a zone, or belt, between Mars and Jupiter. It was supposed that these had been formed by some large planet being shattered to bits, but we are as yet quite unable to explain the history of this wonderful group of hundreds of little planets. The first was discovered on the first evening of the nineteenth century, and was named Ceres.

We have long given up naming the minor planets, however, and most of them are now known simply by numbers and letters. They shine, so far as we know, entirely by reflected sunlight. It is probable that, as we travel outwards from them, the other bodies in the solar system shine not only by reflected sunlight, but also by some light of their own. From Jupiter outwards the planets contribute more and more of their own light to the light by which we see them; and it is especially interesting if we compare these four planets—Jupiter, Saturn, Uranus, Neptune—to find that, as we travel outwards from the sun, each of these planets contains more and more *hydrogen*, which glows and contributes

its own kind of light to the light by which we see them. It is interesting that there should be so much of the lightest of the elements in the outermost planets.

Far away beyond Mars and the minor planets, at an average distance of 483,000,000 miles from the sun, we find Jupiter, the largest of the planets. The year of Jupiter is more than 4,380 of our days, so that we may reckon, if we please, how many times the little earth goes round the sun while Jupiter completes one of his mighty years. This great planet has a diameter of about 87,000 miles; but though it is so large, its distance from the earth greatly interferes with our study of it. At the most favorable oppositions—or when it is most favorably *opposite* to us—Jupiter is about four times as far away from us as the sun is, and as his diameter is only one-tenth that of the sun, it is difficult to learn much about him.

When we come to study Jupiter, we find at once a very great difference indeed from any of the planets we have seen yet. This is not the mere question of size, but something much more interesting—the material of which the planet is made. Jupiter is not a solid, but partly a liquid and partly a gas.

JUPITER, A PLANET AS BIG AS 1,200 WORLDS LIKE OURS

This fact about Jupiter goes, of course, with what we have already learnt as to the planet giving out some light of its own, like the gaseous sun itself, though on a very much smaller scale. This huge mass of matter spins upon itself at an extraordinary speed.

The day of Jupiter is less than ten hours long, and as Jupiter is so much larger than the earth, we can reckon that anything on the equator of Jupiter must be spinning round 27 times as fast as anything on the equator of the earth. That is the reason why Jupiter bulges so much at the equator. We said that the diameter of the planet is 87,000 miles, but that is the diameter taken through the equator. The diameter from Pole to Pole is about 5,000 miles less. All this is due to the very rapid spinning of a body which is not made of rigid solids, but of liquid and gas.

If Jupiter is so differently made from the other planets we have studied, we shall expect that it is nothing like so dense, nothing like so heavy in proportion to its size, as the earth. Jupiter is about 1,200 times the size of the earth. But when we study the influence of the planet upon his own moons, or upon other planets, or upon comets, we find that his gravitation is just enough to mean that Jupiter is only about 300 times, instead of 1,200 times, as powerful as the earth. This means, of course, that the stuff of which Jupiter is made is, on the average, only about a fourth as heavy as the stuff of which the earth is made.

WHY IT SEEMS THAT JUPITER IS NOW LIKE THE EARTH USED TO BE

All this suggests to us strongly that, just as Mars and the moon represent stages in histories of worlds much later than the stage in which the earth is now, Jupiter represents a much earlier stage, such as the earth must have been in ages ago. Directly we ask why Jupiter should be so backward, as one might say, we see the answer at once. It must be because Jupiter is so big, and so loses his heat, and turns solid or freezes, as we might say, very slowly. If we compare the size and the present state of Jupiter, the earth, Mars, and the moon, we find the state of things just what we should expect. The smallest is the one that has, so to say, lived its life quickest, and the biggest is the one that is still young.

Jupiter has nine moons. It is possible that the outermost moon, and perhaps even more of them, may be really comets caught by the attraction of Jupiter, and compelled to travel round him. We can observe the influence of Jupiter's great size upon comets, and even upon the planets nearest him, and it is quite likely that Jupiter might catch a comet altogether. Such a comet would have no tail, and might appear like a moon to us.

The surface of Jupiter, like that of the sun, travels round at different rates in different parts. Maps of Jupiter differ from year to year. What the planet's future will be we can only guess.

SATURN, THE WORLD WHERE MEN WOULD BE OLD AT THREE YEARS OF AGE

Far out beyond Jupiter—indeed, almost twice as far as Jupiter from the sun—is the planet Saturn. Its average distance from the sun is about 870,000,000 miles. Its year is very nearly thirty of ours in length; it is not very much smaller than Jupiter, having a diameter

of over 70,000 miles. Like Jupiter, Saturn bulges much at its equator, and for the same reason. It is made of materials by no means rigid, and its day is only a little over ten hours, so that if there were men living on this planet, and they lived the same age as we do, they would be as old in three years as we are at ninety.

Like Jupiter, Saturn is very hot and light. We have probably never seen any more than the hot atmosphere of Saturn, just as we can see no farther than the hot atmosphere of the sun. Saturn is the least dense of all the planets—far less dense than the earth, or even than water. But it is so large that, though its density is so small, it yet weighs more than eighty times as much as the earth.

SATURN'S RINGS, UNLIKE ANYTHING ELSE WE KNOW IN THE SKY

Saturn has nine moons, and possibly more. The ninth has only lately been discovered, and moves in a very peculiar way. We must be careful not to take it for granted, as some people do, that the moons of all the planets were formed from these planets, as our moon was formed from the earth. It seems that this certainly cannot have been so in the case of the ninth satellite of Saturn.

But the great feature of Saturn is his rings, which are utterly unlike anything else we know in the sky. They were first seen by Galileo, but were not understood until after his time. The rings throw shadows on Saturn, showing that we see the planet mainly by reflected sunlight. We can prove that the rings cannot be solid, but must be made of separate parts. There seems to be no doubt that just now something is happening in Saturn's rings, and astronomers are closely watching the changes that are going on in them. Perhaps they may be broken up, and the stuff which makes them may be drawn into the planet, bringing the rings to an end.

URANUS, THE WORLD THAT LIES FAR BEYOND SATURN, AND HAS FOUR MOONS

Far out beyond Saturn, at an average distance of some 1,754 millions of miles from the sun, there travels another planet, known to mankind for less than a century and a half, which is called Uranus. This planet, like Jupiter and Saturn, is still far from having shrunk down into hardness. It is some 31,000 miles in diameter, and its year is about 83 of ours, so that it has only been about one and a half times round the sun since it was first seen by man. Uranus was discovered by a great German, called William Herschel, who made a living in England by music, but devoted to the study of the heavens every moment he could spare from earning his daily bread. We read his story on another page. Unable to afford a large telescope, this wonderful man made for himself what was then the largest telescope in the world, helped by his scarcely less wonderful sister, Caroline. He discovered Uranus in 1781.

The planet is too far away for us to know whether it spins on itself, and, if so, at what speed. It has four moons, also discovered by Herschel.

Though Uranus in the next sixty years after its discovery had not completed one revolution round the sun, astronomers found that its movements were not strictly in an ellipse.

Knowing the law of gravitation, astronomers were led to suppose that this irregularity in the movement of Uranus must be due to yet another planet, revolving round the sun at a still greater distance. In 1846 that planet was found.

HOW A MAN TURNED HIS TELESCOPE AND FOUND A WORLD NOT SEEN BEFORE

Calculations had been made, and astronomers were directed to look in a certain part of the heavens for the supposed planet that would account for the path of Uranus. They did so, *and found it.* Probably never in the history of knowledge has there been a more wonderful discovery. It stands to the immortal record of a Frenchman, Le Verrier, and an Englishman named Adams, who independently worked out where the unseen planet must be.

The name of Neptune was given to it, and we believe that it is the outermost member of the solar system. Its average distance from the sun is 2,750,000,000 miles—another 1,000 *million miles* beyond even Uranus; its year is about 165 of our years, so that it has not yet traveled half of one journey round the sun since its discovery about the middle of the nineteenth century. We know nothing of its spinning upon itself. It is slightly larger than Uranus, and it has one moon.

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THE PRINCE WHO WAS POOR

CONTINUED FROM 2319

THERE was once a poor Prince who had a kingdom. His kingdom was very small, but still quite large enough to marry upon, and he wished to marry.

It was certainly rather cool of him to ask the Emperor's daughter to marry him. But so he did; for his name was renowned far and wide.

It happened that where the Prince's father lay buried there grew a rose-tree—a most beautiful rose-tree, which blossomed only once in every five years, and even then bore only one flower, but that was a rose! It smelled so sweet that all cares and sorrows were forgotten by him who inhaled the fragrance.

The Prince also had a nightingale, which sang as though all the sweet melodies in the world had a dwelling in its little throat. These the Prince prized above all other possessions, and so he placed them in two silver caskets, and sent them to the Princess.

The Emperor had them brought into a large hall, where the Princess was playing with the ladies of the court; and when she saw the caskets she clapped her hands for joy.

"Ah, if there were but a little pussy-cat in one of the caskets!" she exclaimed; but just then the rose-tree, with its beautiful rose, came to view.

The young Princess touched it, and was almost ready to cry from disappointment.

"Oh, father!"

"Let us see what is in the other casket," proposed the Emperor. So the nightingale came forth, and sang so delightfully that at first no one could say anything ill-humored of it. Everyone but the Princess was charmed.

"I hope that it is not a real bird," said the Princess.

"Yes, it is a real bird," said those who had brought it. "Well, then, let the bird fly," returned the Princess, and she positively refused to see the Prince.

However, he was not easily discouraged. He was determined to see her, so he daubed his face with brown and black, pulled his cap over his ears, and knocked at the door.

"Good-day to my lord the Emperor," he said. "Can I have employment at the palace?"

"Why, yes," said the Emperor; "I want someone to take care of the pigs, of which we have a great many."

So the Prince was appointed "Imperial Swineherd." He had a dirty little room close by the pigsty, and there he sat the whole day and worked. By the evening he had made a pretty little saucepan. Little bells were hung all round it; and while the pot was boiling these bells tinkled merrily, and played an old melody.

But, what was still more curious,

whoever held his finger in the steam from this saucepan smelled the dishes that were cooking on every hearth in the city.

Now, the Princess happened to walk that way, and when she heard the tune she stood quite still, and seemed pleased, for she could play this old tune—it was the only piece she knew.

"Why, there is my piece," said the Princess; "that swineherd must certainly have been well educated. Ask him the price of the instrument."

So one of the court ladies ran in.

"What will you take for the saucepan?" inquired the lady.

"I will have ten kisses from the Princess," said the swineherd.

"Indeed!" said the lady.

"Well, what does he say?" asked the Princess.

"I cannot tell you," replied the lady; "it is too bad!"

"Then you can whisper it!" So the lady whispered it.

"He is an impudent fellow!" said the Princess, and she walked on. But when she had gone a little way the bells tinkled so prettily that she stopped.

"Ask him if he will have ten kisses from my companions," said she.

"No, thank you!" answered the swineherd; "ten kisses from the Princess, or I keep the saucepan myself."

"That must not be, either," said the Princess; "but do you all stand before me, that no one may see us."

The court ladies placed themselves in front of her, and spread out their dresses, and the swineherd got ten kisses, and the Princess the saucepan.

That was delightful. The saucepan was kept boiling all the evening, and the whole of the following day. They knew perfectly well what was cooking at every fire in the city, from the chamberlain's to the cobbler's. The court ladies danced and clapped their hands.

"We know who has soup and who has pancakes for dinner to-day, who has cutlets and who has eggs. How interesting!" said the court ladies.

The swineherd—that is to say, the Prince, although no one knew that he was other than an ill-favored swineherd—let not a day pass without working at something. At last he constructed a rattle which, when it was swung, played all the waltzes and jig-tunes which had ever been heard.

"Ah, that is wonderful!" said the Princess, when she passed by. "Ask him the price of the instrument."

"A hundred kisses from the Princess," said the young lady who had asked.

"I think he is not in his right senses," replied the Princess, and walked on; but when she had gone a little way she stopped. "We must encourage art," she said. "Tell him he shall have ten kisses from me, and the rest from you."

"Oh, but we should not like that at all!" they said.

"What are you muttering?" asked the Princess. "If I can kiss him, surely you can!"

So the young ladies were obliged to go to him again.

"A hundred kisses from the Princess!" he said.

"Stand around!" said the Princess; and all the ladies stood around while the swineherd kissed the Princess.

"What can be the reason for such a crowd close by the pigsty?" said the Emperor, who happened just then to step out on the balcony. "I must go down to see what they are about!"

When he reached the courtyard he moved very softly, and the ladies were so much engrossed with counting the kisses that they did not see the Emperor.

"What is all this?" he said, when he saw what was going on; and he boxed the Princess's ears, just as the swineherd was taking the eighty-sixth kiss.

"March out!" cried the Emperor, for he was very angry; and both Princess and swineherd were thrust outside the city.

"Alas!" cried the Princess. "If I had but married the handsome young Prince! Ah, how unfortunate I am!"

Then the swineherd went behind a tree on the river bank, where he had hidden his own garments. There he washed the color from his face, threw off his dirty clothes, and when he stepped forth in his princely robes he looked so noble that the Princess could not help but bow before him.

"You are rightly served!" he said. "You would not marry an honorable Prince; you could not prize the rose and the nightingale; but you were ready to kiss the swineherd for the sake of a trumpery plaything!"

And the poor Prince, turning away, went back to his kingdom alone.

THE EMPEROR CAME UP TO THE PIGSTY



As soon as the Emperor reached the courtyard he moved very softly, and the ladies were so engrossed with counting the kisses that they did not see him. "What is all this?" he said, when he saw what was going on.

THE MERRY COBBLER AND HIS COAT

A TALE FROM GRANNY'S WONDERFUL CHAIR

SPARE, the merry cobbler, of whom we read on page 2311, where this tale begins, was treated like a prince at the King's court; and the news of his good fortune reached his brother Scrub in the moorland cottage one first of April, when the cuckoo came again with two golden leaves.

"Think of that!" said Fairfeather. "Here we are spending our lives in this humdrum place, and Spare making his fortune at court with two or three paltry green leaves! What would they say to our golden ones? Let us make our way to the King's palace."

Scrub thought this excellent reasoning. So, putting on their holiday clothes, Fairfeather took her looking-glass and Scrub his drinking-horn, which happened to have a very thin rim of silver, and, each carrying a golden leaf carefully wrapped up that none might see it till they reached the palace, the pair set out in great expectation.

How far Scrub and Fairfeather journeyed I cannot say, but when the sun was high and warm at noon they came into a wood feeling both tired and hungry.

"Let us rest ourselves under this tree," said Fairfeather, "and look at our golden leaves to see if they are quite safe."

In looking at the leaves, and talking of their fine prospects, Scrub and Fairfeather did not perceive that a very thin old woman had slipped from behind the tree, with a long staff in her hand and a great wallet by her side.

"Noble lord and lady," she said, "will ye condescend to tell me where I may find some water to mix a bottle of mead which I carry in my wallet, because it is too strong for me?"

As the old woman spoke, she pulled out a large wooden bottle such as shepherds used in the ancient times, corked with leaves rolled together, and having a small wooden cup hanging from its handle.

"Perhaps ye will do me the favor to taste," she said. "It is only made of the best honey. I have also cream cheese and a wheaten loaf here, if such honorable persons as you would not think it beneath you to eat the like."

Scrub and Fairfeather became very condescending after this speech. They were now sure that there must be some appearance of nobility about them; besides, they were very hungry, and, having hastily wrapped up the golden leaves, they assured the old woman they were not at all proud, notwithstanding the lands and castles they had left behind them in the North Country, and would willingly help to lighten the wallet.

The old woman was a wood-witch; her name was Buttertongue; and all her time was spent in making mead, which, being boiled with curious herbs and spells, had the power of making all who drank it fall asleep and dream with their eyes open. She had two dwarfs of sons; one was named Spy, and the other Pounce. Wherever their mother went, they were not far behind; and whoever tasted her mead was sure to be robbed by the dwarfs.

Scrub and Fairfeather sat leaning against the old tree. The cobbler had a lump of cheese in his hand; his wife held fast a hunch of bread. Their eyes and mouths were both open, but they were dreaming of great grandeur at court, when the old woman raised her shrill voice:

"What ho, my sons! Come here, and carry home the harvest!"

No sooner had she spoken than the two little dwarfs darted out of the neighbouring thicket.

"Idle boys!" cried the mother. "What have you done to-day to help our living?"

"I have been to the city," said Spy, "and could see nothing. These are hard times for us — everybody minds his business so contentedly since that cobbler came. But here is a leathern doublet which his page threw out of the window; it's of no use, but I brought it to let you see I was not idle." And he tossed down Spare's doublet with the merry leaves in it, which he had been carrying like a bundle on his little back.

To explain how Spy came by it, it must be said that the forest was not far from the great city where Spare lived in such high esteem. All things

TWO DWARFS RAN UP TO THE OLD WITCH



Scrub and Fairfeather sat leaning against the old tree. The cobbler had a lump of cheese in his hand; his wife held fast a hunch of bread. Their eyes and mouth were both open, but they were dreaming of grandeur at court, when the old woman raised her shrill voice, and two little dwarfs darted out of the thicket.

had gone well with the cobbler till the King thought that it was quite unbecoming to see such a worthy man without a servant. His Majesty therefore appointed one of his own pages to wait upon him. The name of this youth was Tinseltoes, and nobody in all the court had grander notions. Nothing could please him that had not gold or silver about it, and his grandmother feared he would hang himself for being appointed page to a cobbler. As for Spare, the honest man had been so used to serve himself that the page was always in the way, but his merry leaves came to his assistance.

Tinseltoes took wonderfully to the new service. Some said it was because Spare gave him nothing to do but play at bowls all day on the palace green. Yet one thing grieved the heart of Tinseltoes, and that was his master's leathern doublet, and at last, finding nothing better would do, the page got up one fine morning earlier than his master, and tossed the leathern doublet out of the window into a lane, where Spy found it.

"That nasty thing!" said the old woman. "Where is the good in it?"

By this time Pounce had taken everything of value from Scrub and Fairfeather —the looking-glass, the silver-rimmed horn, the husband's scarlet coat, the wife's gay mantle, and, above all, the golden leaves, which so rejoiced old Buttertongue and her sons that they threw the leathern doublet over the sleeping cobbler for a jest, and went off to their hut in the heart of the forest.

The sun was going down when Scrub and Fairfeather awoke from dreaming that they had been made a lord and a lady, and sat clothed in silk and velvet, feasting with the King in his palace hall. It was a great disappointment to find their golden leaves and all their best things gone. Scrub tore his hair, and vowed to take the old woman's life; while Fairfeather lamented sore. But Scrub, feeling cold for want of his coat, put on the leathern doublet without asking whence it came.

Scarcely was it buttoned on when a change came over him. He addressed such merry discourse to Fairfeather that, instead of lamentations, she made the wood ring with laughter. Both busied themselves in setting up a hut of boughs, in which Scrub kindled a fire with a flint of steel, which, together with his pipe, he had brought unknown to Fairfeather, who had told him the like was never heard of at court. Then they found a pheasant's nest at the root of an old oak, made a meal of roasted eggs, and went to sleep on a heap of long green grass which they had gathered, with nightingales singing all night long in the old trees about them.

In the meantime Spare had got up and missed his doublet. Tinseltoes, of course, said he knew nothing about it. The whole palace was searched, and every servant questioned, till all the court wondered why such a fuss was made about an old leathern doublet. That very day things came back to their old fashion. Quarrels began among the lords, and jealousies among the ladies. The King said his subjects did not pay him half enough taxes, the Queen wanted more jewels, the servants took to their old bickerings and got up some new ones. Spare found himself getting wonderfully dull, and very much out of place, and nobles began to ask what business a cobbler had at the King's table; till at last his Majesty issued a decree banishing the cobbler for ever from court, and confiscating all his goods in favor of Tinseltoes.

That royal edict was scarcely published before the page was in full possession of his rich chamber, his costly garments, and all the presents the courtiers had given him; while Spare was glad to make his escape out of the back window, for fear of the angry people

The window from which Spare let himself down with a strong rope was that from which Tinseltoes had tossed the doublet, and as the cobbler came down late in the twilight, a poor woodman, with a heavy load of faggots, stopped and stared in astonishment.

"What's the matter, friend?" said Spare. "Did you never see a man coming down from a back window before?"

"Why," said the woodman, "the last morning I passed here a leathern doublet came out of that window, and I'll be bound you are the owner of it."

"That I am, friend," said the cobbler with great eagerness. "Can you tell me which way that doublet went?"

"As I walked on," the woodman

said, "a dwarf, called Spy, bundled it up and ran off into the forest."

Determined to find his doublet, Spare went on his way, and was soon among the tall trees; but neither hut nor dwarf could he see. At last the red light of a fire, gleaming through a thicket, led him to the door of a low hut. It stood half open, as if there was nothing to fear, and within he saw his brother Scrub snoring loudly on a bed of grass, at the foot of which lay his own leathern doublet; while Fairfeather, in a scarlet kirtle, sat roasting pheasants' eggs by the fire.

"Good - evening, mistress!" said Spare.

The blaze shone on him, but so changed was her brother-in-law with his court life that Fairfeather did not know him, and she answered far more courteously than was her wont.

"Good - evening, master! Whence come ye so late? But speak low, for my good man has sorely tired himself cleaving wood, and is taking a sleep, as you see, before supper."

"A good rest to him," said Spare, perceiving he was not known. "I come from the court for a day's hunting, and have lost my way in the forest."



THE ASTONISHED WOODMAN STARED AT SPARE

"Sit down and have a share of our supper," said Fairfeather; "I will put some more eggs in the ashes; and tell me the news of court."

"Did you never go there?" said the cobbler. "So fair a dame as you would make the ladies marvel."

"You are pleased to flatter," said Fairfeather; "but my husband has a brother there, and we left our moorland village to try our fortune also. An old woman enticed us with fair words and strong drink at the entrance of this forest, where we fell asleep and dreamt of great things; but when we woke everything had been robbed from us, and, in place of all, the robbers left him that old leathern doublet, which he has worn ever since, and never was so merry in all his life, though we live in this poor hut."

"It is a shabby doublet, that," said Spare, taking up the garment, and seeing that it was his own, for the merry leaves were still sewed in its lining. "It would be good for hunting in, however. Your husband would be glad to part with it, I dare say, in

exchange for this handsome cloak." And he pulled off the green mantle and buttoned on the doublet, much to Fairfeather's delight, for she shook Scrub, crying:

"Husband, husband, rise and see what a good bargain I have made!"

Scrub rubbed his eyes, gazed up at his brother, and said:

"Spare, is that really you? How did you like the court, and have you made your fortune?"

"That I have, brother," said Spare, "in getting back my own good leathern doublet. Come, let us eat eggs, and rest ourselves here this night. In the morning we will return to our own old hut, at the end of the moorland village, where the Christmas cuckoo will come and bring us leaves."



SPARE PULLED OFF THE GREEN MANTLE AND BUTTONED ON THE OLD LEATHERN DOUBLET

Scrub and Fairfeather agreed. So in the morning they all returned, and found the old hut little the worse for wear and weather. The neighbors came about them to ask the news of court, and see if they had made their fortune. Everybody was astonished to find the three poorer than ever, but somehow they liked to be back in the hut. Spare brought out the lasts and awls he had hidden in a corner; Scrub and he began their old trade, and the whole North Country found out that there never were such cobblers. Everybody wondered why the brothers had not been more appreciated before they went away to the court of the King, but, from the highest to the lowest, all were glad to have Spare and Scrub back again.

They mended the shoes of lords and ladies as well as the common people; everybody was satisfied. Their custom increased from day to day, and all that were disappointed, discontented, or unlucky, came to the hut as in old times, before Spare went to court.

The hut itself changed, no one knew how. Flowering honeysuckle grew over its roof; red and white roses grew thick about its door. Moreover, the Christmas cuckoo always came on the first of April, bringing three leaves of the merry tree—for Scrub and Fairfeather would have no more golden ones. So it was with them when I last heard the news of the North Country.

LEGENDS OF PLACES AND THINGS

KING WREN

WHEN all the birds came together to choose their king, there was much dispute as to the manner of choosing.

"Beauty is what we want in a king," said the peacock. "Let us show off out feathers."

"No, we need dignity," said the owl. "Let us see who is the wisest looking."

"Or who can talk the best," said the parrot.

But the eagle exclaimed:

"What raises us above all other creatures? The power of flying. We must choose as a king the bird that flies the highest."

And as the eagle was strong and fierce, he compelled the assembly to agree to this test. As a signal, the birds rose up, and tried to outfly each other, but the eagle soon soared above them all, and went up to an amazing height until his strength was exhausted. Then a wren, who had been perching on his back, flew a little higher than the eagle had gone. So, to the great disgust of the eagle, the little wren became king.

THE POET, THE GOBLIN, AND THE DONKEY

FAIRIES have more powers of magic than witches, and great poets have more powers of magic than fairies. Great poets can raise up mighty nations with their enchantments, and people the waste places with shining spirits.

Thomas the Rhymer was one of the last of these great poets. He could sing a man's soul out of a man's body, and send it whither he willed. One day the youngest daughter of the Queen of Scotland fell ill of the disease which no leech can cure, and the Queen sent Thomas the Rhymer to get some magic ointment from the goblin hiding in the heart of Ailsa Craig. Thomas the Rhymer came to Ailsa Craig and began to chant strange chants there. He chanted the head of the goblin out of the great rock; he chanted its shoulders out. But just as he was chanting out its hand holding the magic ointment, a donkey brayed and spoiled his chant, and frightened the goblin clean out of the rock, and the goblin escaped with the magic ointment. So it has happened ever since. Some donkey always begins to bray when a great poet begins to sing. That is why no great poet nowadays can work such marvelous enchantments as Thomas the Rhymer worked before he went to Ailsa Craig.

THE GIANT OF THE PEAK

KITTY GREEN was a little girl who lived in the Peak district, and one Sunday, instead of going to church, she went for a walk. And she walked until she came to an enchanted mountain, which made everybody who trod on it fall asleep. So Kitty fell asleep, and the giant of the Peak found her and carried her to his castle, and made her his servant. After Kitty had cleaned his enormous boots, he said:

"Come and hold my golden ring and ball while I bathe, and mind you don't let the ball fall into the ring."

Kitty took them, but just as she was wishing she was back at home she let the ball slip into the ring, and she at once found herself at home with her father and mother Then, every time that she wished for anything, she only had to put the ball in the ring and her wish was at once granted. So she became very rich and happy.

THE BROWNIE OF SNAEFELL

BROWNIES are different from fairies. They are little clumsy goblins with hairy legs, and they are good-natured, but rather stupid. A farmer in the Isle of Man befriended a brownie, and the brownie offered to bring down the farmer's sheep from Snaefell mountain.

"Whoo!" he said, when he returned late at night. "That little ram of yours was a trouble. I had to chase him three times round Snaefell before he would come with the other sheep."

"My little ram?" said the farmer. "I haven't one."

He looked at the sheep, and among them he saw a poor, tired hare! Now, could you fancy a fairy mistaking a hare for a sheep? But brownies are like that—good-natured, but rather stupid.



THE FABLES OF ÆSOP THE SLAVE

THE LARK AND HER YOUNG ONES

A LARK once had a nest of young birds in a cornfield, and one morning as she went out to seek food for them she told the little larks to listen very carefully to anything they might hear the farmer say, and to tell her when she came back.

On her return they said that the farmer had been there with his son, and had arranged to ask his neighbors to come upon the next day and help him to reap the corn.

"Then," said the old bird, "there is no danger yet."

Next day the young larks told their mother that the farmer had been there again, and had told his son to ask his cousins to come and help to reap the corn. The old lark still said that there was no danger yet.

On the third day the young birds told their mother how the farmer had said



that next morning he would reap the corn himself.

"Then," answered the mother lark, "it is time that we went somewhere else. The farmer's neighbors and friends were not very likely to come and help him; but if he is going to reap the corn himself we must move our home to another field."

If you want a thing done, do it yourself.

THE FOX AND THE WOLF

A FOX had the misfortune to fall into a well, where he was in danger of drowning. He cried out for help, and a wolf happened to hear him, and came running up to see what was the matter.

"Oh, Mr. Wolf," cried the fox, "pray lend me a hand and help me out, or I shall be drowned!"

"Poor creature!" cried the wolf. "How sorry I am to see you in such a fix! How long have you been here? However did it happen? The water must feel very cold. Is it very deep?"

"Come, come! This is no time for talking," said the fox. "Help me out



of the water first, and then I will tell you all about it."

Don't stand talking when there is work to be done.

THE DONKEY'S WISH

ONE cold winter's day a discontented donkey was wishing for a little warm weather and some fresh grass, instead of the cold shed in which he stood and the dry straw that he had to eat.

By and by the warm spring weather came and the fresh grass with it; but the donkey had now so much work to do that he soon grew tired of the spring and longed for the summer. When summer came he found himself still worse off, for he had to carry hay and vegetables through the long, hot days.

So he wished for the autumn to come; but when it arrived he had to work hard and carry grain, apples, fuel, provisions for the winter, and so on; until at last



he began to long for winter, when, at any rate, he would be able to rest, even if he did not have much to eat.

Try to be contented with what you have. Remember that you might be much worse off than you are.

THE NEXT STORIES BEGIN ON PAGE 2629.

THE LIVING FLOWERS OF THE SEA



These creatures are the simplest forms of animal life now existing, and in many ways resemble the lower forms of vegetable life

A Trumpet anemone
A1 Purple-tipped sea-urchin
B Snake-locked anemone
B1 Gold-spangled anemone
C Brittle starfish
D Plumose anemone
E Scarlet-fringed anemone
F Diadem-pimplet anemone
G Beadlet anemones
H The opelet anemone
J Pink-feather-star
K Sea cucumber
L Globehorn anemone
M Glaucous pimplet anemone
N Dahlia wartlet anemone
O Tutt coral
P Anemone on whelk-shell
Q Venus's flower-basket
R Gaselet anemone
S Tube-forming annelids
T Arrow mazzlet in sand, and T1, exposed
U Sea-cucumber
V Five finger starfish
W Devonshire cup coral open and W1 & W2 closed
X Scarlet star coral
Y Siphon worm in shell
Z Siphon worm

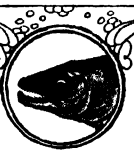
Most of these have feelers and depend chiefly on the sense of touch for food. The feelers seize the food and draw it into the stomach

THE FISHES OF THE SEA

WE know that all life began in the sea, and we have read on page 52 how life came out of the sea to cover the land. But life did not leave the sea for ever. There is still more life in the depths of the ocean than on the land. The sea teems with unnumbered forms of life—life as simple as that which first swam in the waters, and life as wonderful as that of the whales and dolphins and seals. There are fishes that sail through the air so high above the water that we call them flying fishes. There are fishes that can crawl out of the water and walk overland. There are fishes that build nests at the bottom of the sea, creatures that build islands and sea-walls; and in cliffs and mountains we find myriads of skeletons of tiny creatures that once lived and breathed on the ocean-bed. In these pages we read of the many wondrous forms of life in the seas to-day.

THE WORLD IN THE WATERS

CONTINUED FROM 2221



NOT the wisest men on earth know the full story of the sea and its wonders. How can they? They have to seek knowledge from the things that their dredges bring up. That is as if we set to work to examine some great, deep lake by bringing up things from its depths in a teaspoon. However, patient work is constantly bringing new learning to us. We know that there is no place in the ocean where life is not possible. The waters of the equatorial regions and the seas of the temperate zone abound with life, but so also do the silent waters of the frozen Arctic Circle.

Nature will have no blank spaces. There is a place for everything, and we find everything in its place. We find, swimming upon the surface, creatures which cannot descend. In the middle depths we find fish which cannot come to the surface lest, without the proper pressure of water upon their bodies, they should burst. Those same creatures cannot descend beyond a certain level; and below these there are creatures which never see the light, fulfilling in the unlit depths of ocean the purpose for which they were created.

For the present it will be interesting for us to glance at some of the lowest forms of life in the sea. We shall find it as wonderful as anything in the whole of Nature's fascinating story. Let us consider the marvels of that class of tiny organisms called *infusoria*. They exist in fresh water and in the water of the sea. In a single cupful of pond-water, such as certain infusorians love, there may be more of them than there are people in the whole world. The rate at which they grow is astounding. One infusorian breaks up into two; two become four; four become eight; eight become sixteen, and so on, almost as we watch.

Given the proper temperature and nourishment, a single infusorian may become in four days the ancestor of a million like itself, in six days of a billion, in seven and a half days of a hundred billions. From that tiny speck we have in seven and a half days this countless host, weighing over 200 lb. Of course, the numbers do not work out like this, for there are merciful checks, or the whole earth and its seas would not hold the creatures that are born.

Floating upon the surface of the sea, and stacked high over its bed, are countless billions of these and similar tiny creatures, dead and living. Of what are the glorious white walls of England, the beautiful chalk cliffs one sees there, composed? Of nothing but the shells of the tiniest little creatures, which

we call *foraminifera*. They were all living creatures millions of years ago. They were born and had their day, and they died, piles upon piles of them, and their shells turned to chalk. And other white cliffs, which may some day rise above the waters, are still being built up beneath the sea to-day. The tiny specks of life in their little shells are still being born, and are still dying down in the sea, and they are forming ooze which will some day be solid chalk. It would take about ten millions of them to make a pound of chalk, but there have been enough to make millions of tons of chalk.

THE LITTLE INSECTS THAT BUILT UP THE STONES OF PARIS AND BERLIN

Some of the greatest mountain ranges, the Alps and the Balkans, consist largely of the shells of little creatures like these, called nummulites. Among the greatest wonders in the world are the Sphinx and the Pyramids in Egypt, built of dead nummulites. They grew in seas which ran where dry land now is. They formed the Arabian chain of mountains; from these mountains men cut the great blocks of which the Sphinx and Pyramids are composed. Paris is built of stone from a similar source, and Berlin stands upon foundations made up entirely of the skeletons of tiny animals.

In view of all this, we shall not be surprized to learn of the wonders of the coral builders. These are very tiny sea animals, which appear in their glory only in the warm waters of sunny seas. We all know what coral is, the beautiful pink polished substance of which necklaces, bracelets, and scores of pretty ornaments are made. We know what coral is, but the way in which it is made was for two thousand years a mystery.

THE LITTLE CORAL BUILDERS THAT WORK DOWN IN THE SEA

Long, long ago, men had been in the habit of bringing it up from the sea in nets and by other means. The common fishermen could not be expected to know a great deal about its composition, but the wise men thought they knew more, and they all agreed that coral was simply a sort of rocky flower grown in the sea. But how could a flower be hard? That was quite simple, they said. The fishermen told them that coral, when in the sea, was quite soft like any other flower, but that as soon as it reached the air it became as hard as rock. And for ages that was believed. But a man who wished to know more sent down a diver, who found, of course, that coral beneath the waves is as hard as coral above the waves. The good man could not believe the word of his diver, but went down in the water to see for himself.

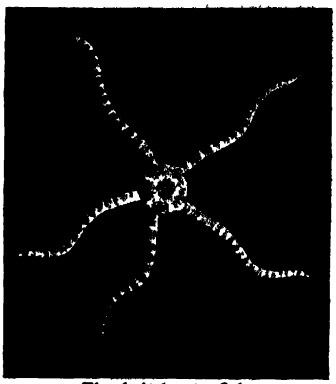
We know now that the coral builder is one of the tiny, tireless workers of the sea. The coral animals are as numerous as the stars of heaven. When born, they are quite soft, jelly-like little things. But they have the power to extract calcium carbonate from the sea-water, and to build with it the most wonderful structures to live in. As a bee makes honey, so the coral animals make a shell from their own food. They build homes of coral for themselves. A number of them work together, and they make their houses join by neat canals or passages. But there are many forms which the buildings take.

THE WONDERFUL ANIMAL WALL THAT RISES FROM THE BOTTOM OF THE OCEAN

Some form the loveliest structures, looking like flowers. The colors are not always the same. There are browns and blues and greens, as well as the more common pink. This coral home is not made as a bird makes its nest, not as the mud plaster in which the rhinoceros loves to bury himself in a swamp; the coral is part of the coral animal itself. It issues from the soft interior of the little animal's body, and is its stony skeleton.

Countless hosts of coral insects working together join their skeletons or coverings to each other. They build up from the shallow water, growing best where the waves may dash upon them. They make great reefs or barriers in the sea where, before, the waves flowed unchecked. The coral insects build islands. They put a great ring of coral round a tract of water, and make a lake within the boundaries of their work, as we see in the picture on page 921. In places where they are most numerous they quite change the character of the sea. The buildings are the actual coverings of the coral insects' bodies. They become solid rock, forming dry land for thousands of miles in the sea. It is the most wonderful work that these little animals do by their own efforts.

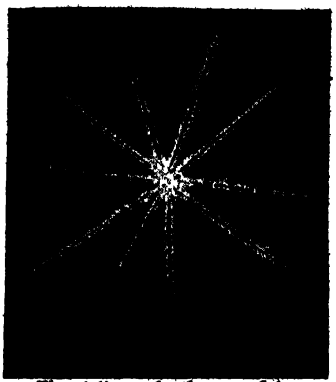
STARFISH & ANIMAL-FLOWERS OF THE SEA



The brittle starfish.



A big sea-slug.



The delicate feather starfish.



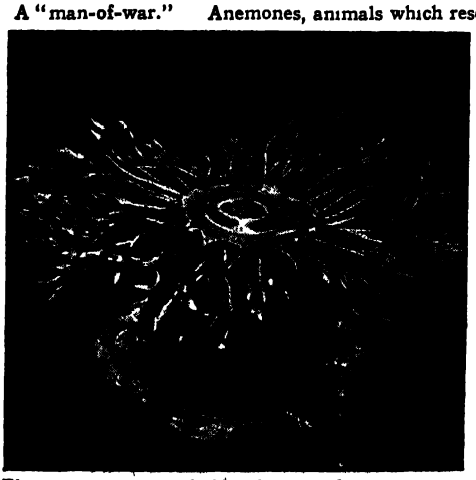
A "man-of-war."

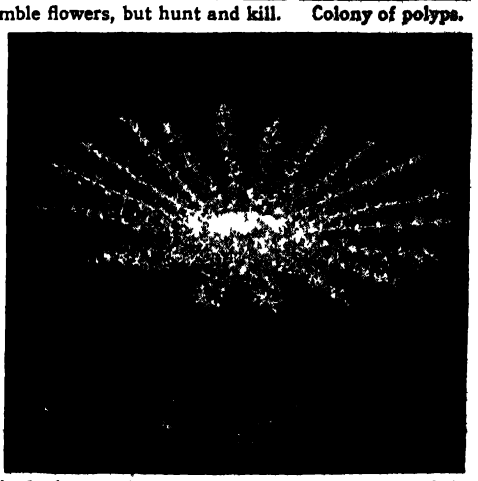


Anemones, animals which resemble flowers, but hunt and kill.



Colony of polyps.





These are two remarkable pictures of sea-anemones, both shown with their mouths wide open and their tentacles spread out ready to grasp the little sea-animals upon which they feed. These sea-anemones look like flowers of the fairest shape and hue, yet they are animals. They hunger, and hunt and kill living prey to satisfy their hunger. They take into partnership other animals, like the hermit crab, that can help them to get food. Riding on the crab's back, they help him to kill his victims, and then share the meal with him. The Portuguese man-of-war is a beautiful thing, but it stings painfully.

The photographs on pages 2413 and 2407 are by Mr Arthur Ullyett, and the lower picture on page 2410 is from a photograph in Dr. Carpenter's book, "The Microscope," by permission of Messrs J & A. Churchill.

We have read in the story of the lighthouse, on page 749, how very difficult men, with all their skill and all their fine tools, find it to build a lighthouse in the sea, but here these tiny animals, working in the depths of the furiously tossing waves, build structures which have no likeness in the world. One of their works consists of a barrier reef along the shores of New Caledonia, 400 miles long, and another, along the north-east coast of Australia, 1,000 miles in extent. As a great man points out, this means a work by these tiny things beside which the wall of China and the Pyramids of Egypt are like children's toys. The work has been going on for many ages, it is going on to-day. Of course, the result is often very serious to ships, which run on to the coral reefs and are wrecked. But that should not happen, for we have charts of the seas to guard our sailors against wreck in such ways.

LIVING AND BUILDING AND DYING IN THE BLUE SEA

If they do damage in this manner, the coral builders are friends to mankind in another way—they provide homes for men where only the angry sea once appeared. Sea-worms of various sorts bore into the coral and loosen it, so that the waves break it up. The great waves pick up huge blocks of the loosened coral, and throw them high up on the reefs, grinding much of them to powder. Shells and sand collect and are ground up together by the action of the waves. The powdered mass collects in the crevices of the reef, and presently seeds blown from afar, or carried by the sea, or brought by birds, take root in the soil that has been slowly forming. Entire trunks of trees, that have been torn up and carried down the rivers and out to sea, find a lodging here. With these trees come small animals, like lizards and insects. Trees grow, sea-birds settle; tired land-birds, blown out to sea, take rest; and at last man comes, to find trees and fruit and birds and other forms of life. Here is a home ready made for him. He cuts down the trees and builds himself a house, and there we have a new part of the world prepared for human habitation. But the creators of it were the myriads of coral animals, living and building and dying in the blue sea.

Growing on the coral reefs and adding to their beauty, we find a great many sea-anemones. At first sight we should say that these are vegetable growths. Their very name suggests it.

THE LIVING FLOWERS THAT GROW ON THE LIVING WALLS OF THE SEA

The wood-anemone we all know, the pretty flower of our American woodlands. Surely, then, the sea-anemone must be our wood-anemone's cousin, growing in the sea? But the anemone of the sea is an animal, which can kill and eat other forms of animal life, and, by some process of instinct too mysterious for us to understand, can enter into partnership with other animals, just as birds enter into partnership with crocodiles, buffaloes, and rhinoceroses. This animal-plant or plant-animal, as we think it, grows in the most elaborate and gorgeous forms. A fairy wand could not create more charming pictures than the anemones present. Some of them appear to have a sense of sight, for what look like eyes appear. They depend, however, chiefly on touch for their food. They have long, sensitive feelers, which look like petals or fringe. These, when anything fit for anemone to eat touches them, close like a flash upon it, and draw it down the tube leading to the anemone's stomach.

Let us watch them in a sea aquarium. The anemone, glistening and gay, grows at the bottom of the water, or on the side of the glass, like some extraordinary fringed mushroom with its head the wrong way up. There is nothing to suggest that this is a hungry little animal. But wait.

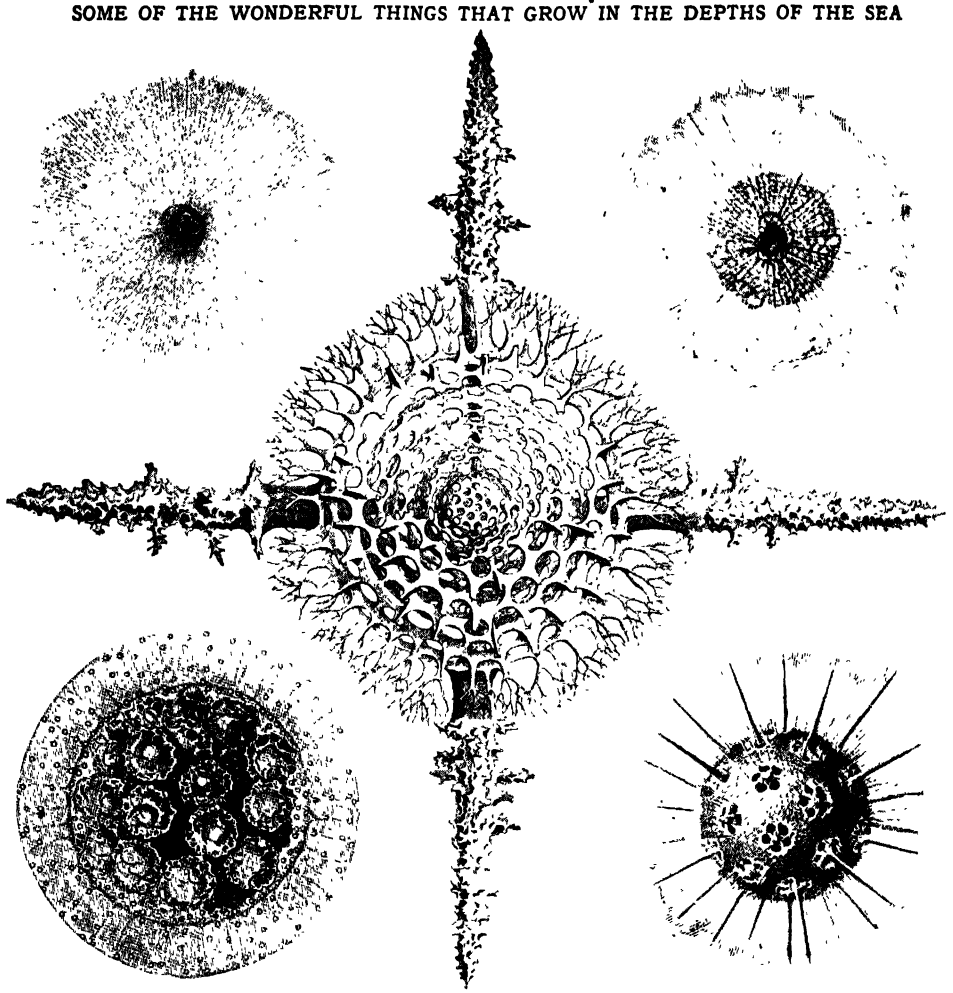
HOW THE ANEMONE LIVES WITH THE CRAB, & THE CRAB WITH THE SPONGES

A lively shrimp darts through the water. The tentacles of the anemone are instantly all in a quiver, ready to catch the little shrimp. The shrimp's instinct or experience tells him what that means, and he darts away if he can. But he cannot always do so. The anemone must live and have his shrimps, or other form of food, and the tentacles close rapidly in, causing the anemone to shut up like a flower which is going to sleep for the night. And if the effort made is quick enough, the poor shrimp is encircled by those terrible tentacles, and drawn in to make a good meal for the deceitful anemone.

There are countless anemones growing upon our seashores. Some look like rosettes, others like bobbins with a frayed, fringed top. The fringe of tentacles lies widely expanded, and we should never dream how quickly they can move. Let us touch the top of the anemone with a finger. It closes at once upon our finger, and we feel that each little spike of the fringe is roughened at the end, and gives a distinct pull at our finger, like the rasped claw of some insect. They are not strong enough to take in our finger, but they have received the necessary impulse which sets them at work. The anemone shuts up, believing—if we may use that word—that it has caught a meal, and for some minutes you will find that it will not attempt to reopen.

It is a humble, lowly form of life, yet there seems so much purpose and set plan about the way of the anemone that we are bound to confess that we are amazed and bewildered at such apparent method and skill. But the wonder only begins here. The partnerships of the anemone are the most wonderful feature of its life. Let us consider for a moment Messrs. Crab, Anemone, and Co. We all know about the hermit crab, for we have seen its portrait and read of its doings on page 1426. Now, as we saw there, the hermit crab, while a vicious, quarrelsome little rascal, has no shell to cover his tail. That

SOME OF THE WONDERFUL THINGS THAT GROW IN THE DEPTHS OF THE SEA

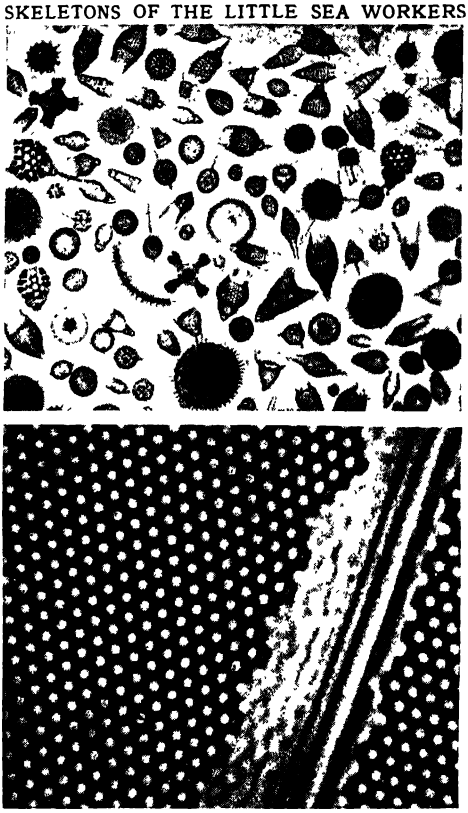


These five objects are the greatly magnified pictures of the minute animals which live in the sea, whose skeletons form chalk cliffs. Though they are so tiny, they are of the greatest beauty when seen through the microscope, and these pictures show the wonderful little creatures as the microscope reveals them.

is the spot which his enemies attack. His one hope in life is, therefore, to win and retain a secure covering for his unprotected tail. He and the anemone seem to come to an agreement. The anemone affords him just the cover that he needs for his tail, and he in exchange rides the anemone about on his back.

The tentacles of the anemone are towards the nippers of the crab, and when he goes in pursuit of his prey, the anemone helps to kill it. The anemone has stings which paralyse or kill a little living animal. The crab has, therefore, a powerful ally to help him in killing his food, and as he eats, the anemone shares his meal. It is a profitable partnership. The crab gets his tail protected; he is largely hidden from his enemies; he is hidden, too, from the things that he desires to attack. The anemone is carried about, and is kept in constant touch with an ample supply of food. Thus we have a life partnership between the simple-looking plant-animal and a desperate warrior who is continually battling.

SKELETONS OF THE LITTLE SEA WORKERS



The top picture is a group of the skeletons of very tiny animalcules called radiolaria. They are composed of a lattice-work of flinty matter, and they fall to the bottom of the deepest ocean and form what is known as Barbadoes earth. The lower picture is a part of the skeleton of one of their fresh-water cousins called diatoms, magnified 4,000 times.

The study of anemones is a most interesting one, and one which we can all pursue, for they abound wherever rocks strew our sea-washed shores. There is no room for us to consider here the many species known, but the pictures in these pages show us some of the wonders and beauties of several famous specimens. Think of them not as plants, but as animals, of which the larger will swallow a quarter, or perhaps a shell the size of a saucer, and then divide into two living animals rather than lose the booty it has managed to secure.

The anemone is not the only sea animal with which the crab goes into partnership. There is a certain sponge in which he makes his home. We know that these things are not vegetables, but animals. They admit the sea-water through the canals in their bodies. From this they extract tiny forms of life for their food, and at the same time take for their breathing the oxygen which the water contains. That is the way fishes breathe. They have no lungs, except in rare cases, which we shall have to read about in a later story. They have gills, over and through which the sea-water washes. These gills take the oxygen from the water, and pass it into the blood-vessels, so that the fishes may breathe as we breathe. The method is, of course, very different, but the purpose and result are the same. Well, that is the way in which the sponge, no matter what its name or size, breathes and feeds and grows. We read more about them on page 4266.

In some of the channels running through the sponge may be found the hermit crab. Higher up in the same channel may be discovered a little shell, and also a little worm. In this collection we have the history of four forms of life. First of all the hermit crab pops his naked tail into the empty shell left by a growing whelk. Then comes a young sponge, sent forth on its life-journey by its parent. It settles upon the whelk-shell in which the crab has sheathed his tail. There

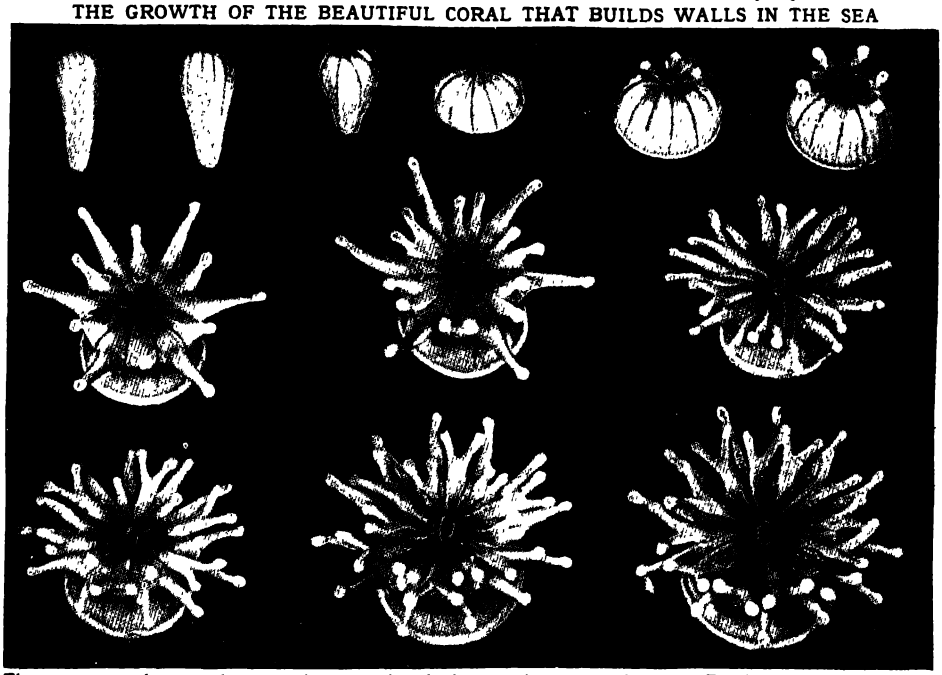
the sponge grows and grows until it quite covers the shell, but leaving open a channel by which the crab can enter and leave. Then as the sponge and the crab grow bigger they take into partnership a little worm, which is admitted into the interior of the sponge, simply that it may devour any refuse which may collect in the home of the crab, Even such humble things as crabs and sponges have to guard against unclean homes; they are as wise as, and more careful than, many human beings. And that is why we find the interior of the sponge occupied by a shell, a worm, and a crab.

Where the corals abound, fishes of the most brilliant color are always to be found. The fishes protect themselves by becoming colored like their surroundings, just as the animals do. But swimming with them are marvels of colored jelly, as they seem. They are the jelly-fish. We may all see jelly-fish at the seaside when the tide goes out. Better still, on a favorable day, we may see hundreds of them floating on the sea as we go by steamer. Those round our northern coasts look like white or transparent leaves, with a little dash of red in the centre, as though they had been darned with colored wool. We do not have the jelly-fish of brilliant color. They belong to the warm seas of the tropics. But the nature of all jelly-fishes is much the same.

Those of the tropics give off a brilliant silvery light at night, which helps to make the sea like a gleaming mirror of liquid metal. Ours are not so attractive. If we catch one and lay it on a piece of blotting-paper for examination, we have to be very quick with the examination, for the jelly-fish is composed largely of water, and it simply dries up before our eyes. They are not nice things to handle; they can sting very badly, as all sea-bathers know. The scientific name of the jelly-fishes and their kin is taken from the Greek word which means nettle, and sea-nettles is another English name for the jelly-fishes that sting.

By far the most alarming of the sea-nettles is the Portuguese man-of-war, or *physalis*. This looks like an inflated bladder, six inches long. Beneath it streams a number of organs, important to the animal in gathering and distributing food. The tentacles which we

THE GROWTH OF THE BEAUTIFUL CORAL THAT BUILDS WALLS IN THE SEA



These pictures show us the marvelous way in which a coral grows in the sea. Reading from left to right we see how the coral insect grows. First we see it when just born, and then gradually changing its form, shooting out more and more tentacles. The coral is the calcareous skeleton of the tiny animal.

By courtesy of the Scientific American.

most wish to avoid are those which carry the stings. These are intended to numb the prey of the physalis, but woe to the man who comes in contact with them. They flow out from the body of the animal some feet into the water, and are heavily charged with stings and a poisonous fluid. The merest touch from them will raise a white swelling on the hand, and for long afterwards the hand and arm experience an aching pain, which gradually extends to the muscles of the chest, causing some trouble in breathing. Even when they have been removed from the body of the physalis the stinging cables retain their power to injure, and from them issues a fluid which, after lying upon cloth for some days, has power still to sting.

The sea-anemones, the corals, the jelly-fish, and many other plant-like sea animals, all belong to the same family. We have another interesting family, including the starfishes, sea-urchins, sand-stars, brittle-stars, feather-stars, and so forth. Their very long name, which we need not bother about, means that they are enclosed in a tough skin in which calcium carbonate is deposited, so as to make the covering into a sort of shell without being a shell.

THE WONDERFUL STARFISH THAT WALKS ALONG THE BOTTOM OF THE SEA

We have all seen hundreds of starfish at the seaside, and the pictures on page 1424 show us what the star-fish looks like to the camera. There is not a simpler, more innocent-looking thing to be found by the sea than the starfish, particularly that commonest of all, the crossfish, as we call the five-fingered one. Yet it is really a rather wonderful creature. Its organs are in the centre of its body, and the fingers branch out from that centre. Now, the fingers are really the legs, for there are tubular feet underneath them by means of which they walk as comfortably along the sea-bottom as we walk along the beach.

The starfish has a terrible appetite, and oysters, mussels, scallops, and other shell-fish are its food. It seizes its prey with its long and strong arms or fingers, and, no matter how powerful the shell may be, by persistent pressure the starfish manages to force it open, and eat the fleshy interior. Fishermen hate the starfish for the damage that they do, and, when they catch them, tear them in two and fling them into the sea. That is not only cruel, but also very stupid. Though you tear a starfish in halves, the animal may recover. Each of the two halves may heal and grow new fingers, and, instead of a dead starfish in two halves, you have *two* starfishes, fully equipped and very much alive.

THE SEA-CUCUMBER THAT THE CHINESE PEOPLE LIKE

The story of the sea-urchin we have already read, but we must remember that the picture that we see on page 1427 is that of only one of a numerous family of urchins. Sailors are glad enough to boil the urchin. They call it the sea-egg, and cook it in the same way as we cook the eggs of poultry.

What we call the sea-cucumber is, like all the other things we have been considering, an animal. Its other names are the sea-pudding, the sea-slug, and the trepang. It has the same sort of feet that the starfishes possess—suckers which protrude from tubes, and can get along over places which seem quite impossible to it.

The common name of the sea-cucumber suggests the idea which its appearance presented to those who bestowed the title upon it. The Chinese consider it a great delicacy for the table. There are many kinds of sea-cucumber, and the rarest fetch quite big prices. It does not sound quite nice to eat sea-slug, and we in this country are content to leave it to the Chinese, who like bird-nest soup, roast rat, and stewed puppy. But perhaps they consider the tastes of those who delight in turtle soup quite as strange as we take their own taste to be.

THE MYSTERY OF THE LOWEST FORMS OF LIFE IN THE SEA

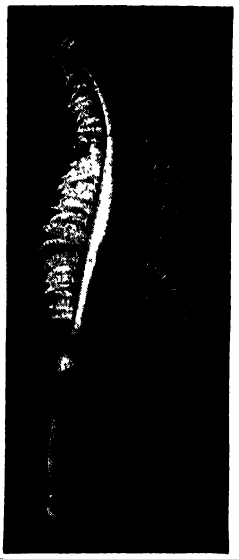
We have now glanced briefly at some of the lowest forms of life in the sea. It is quite as wonderful as life among the higher animals. We do not expect much of animals that seem to be no more highly gifted with life than plants; but, as we have now seen, there is a mystery and fascination about these lowly creatures sufficient to make even the wisest men marvel at their habits.

THE NEXT STORIES OF FISHES BEGIN ON PAGE 2477.

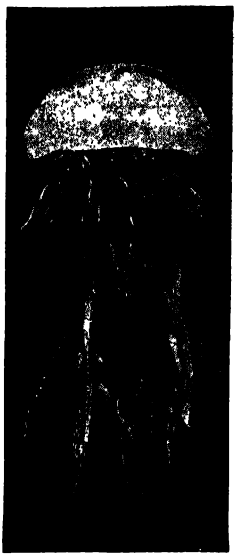
STRANGE FORMS OF LIFE BELOW THE SEA



A colony of polyps.



Sea-pen formed of animals.



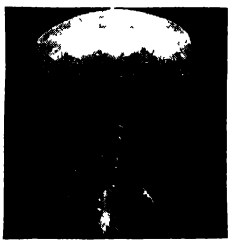
A Portuguese man-of-war.



A colony of polyps.

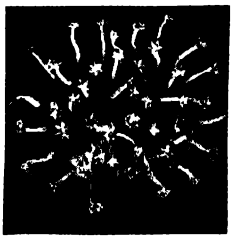


White coral.

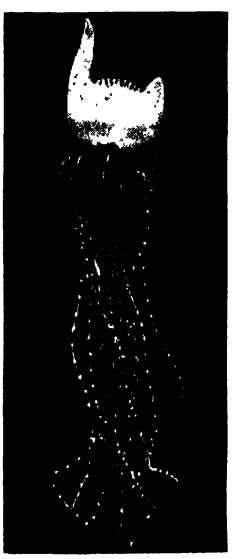




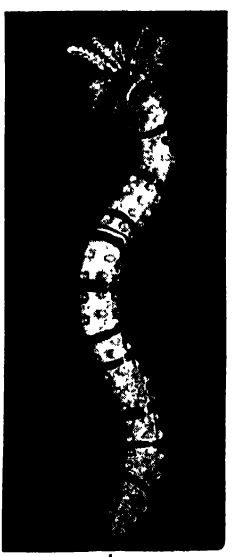
Two beautiful forms of medusa which sting terribly.



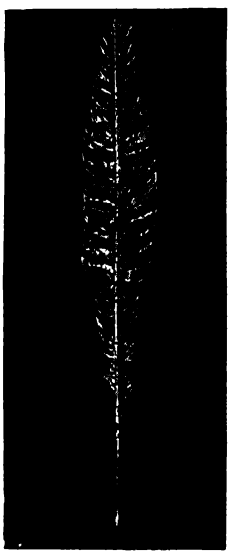
White coral.



A beautiful sea-nettle.



A jeweled sea-slug



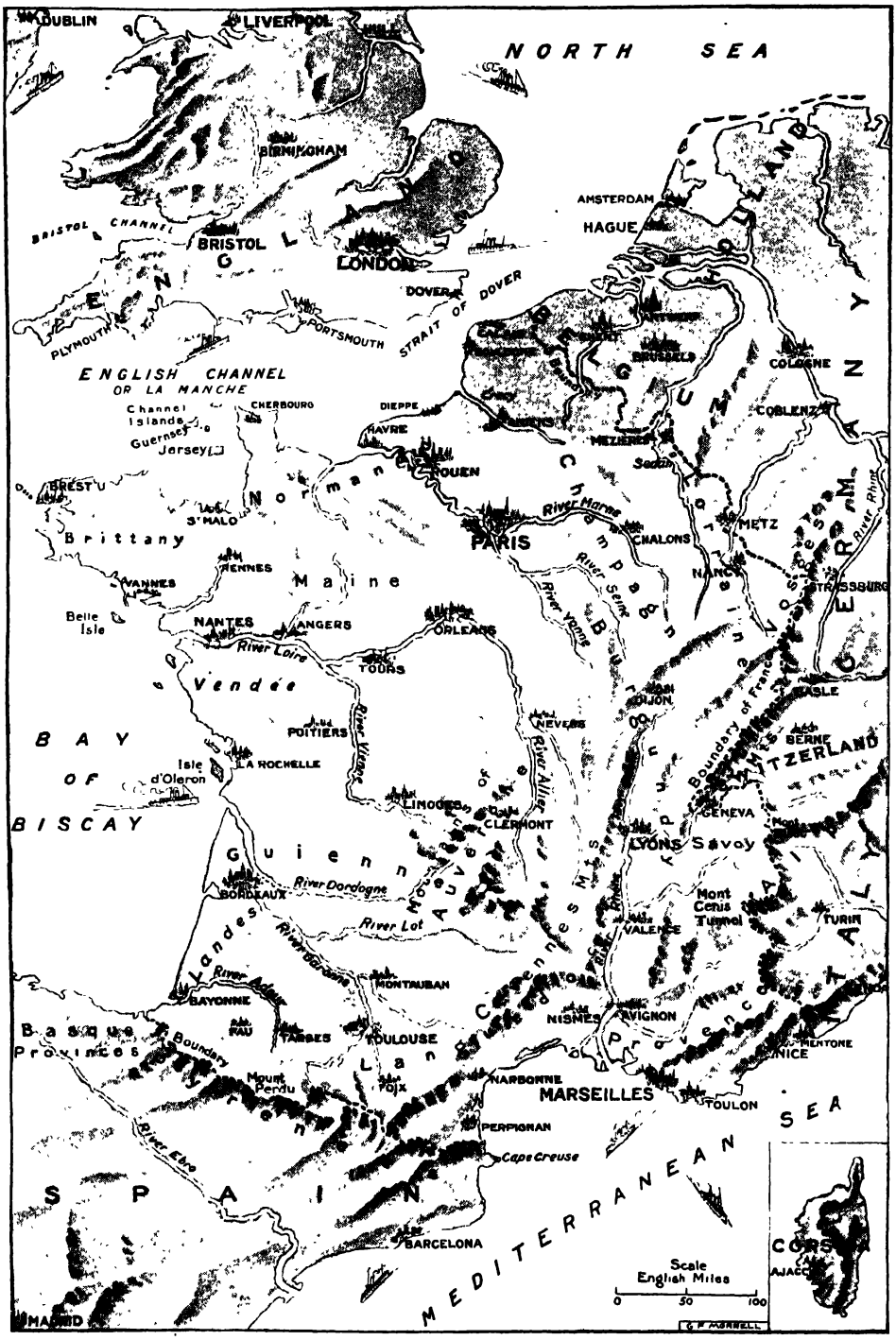
A sea-pen.



Colony of tiny sea animals.

These are photographs of animals living in the sea. Many of them belong to the sea-nettle family, stinging far worse than the nettle. A touch from the tentacles of a medusa will make a man ill all day, and he will feel the effects for weeks after. Strong winds sometimes drive them on to our coasts, where they annoy bathers.

FRANCE AND HER MANY NEIGHBORS



Unlike Great Britain, France has many neighbors which actually touch her, as shown in this map. The map also shows the principal rivers and mountains of France, and from it we can see how much bigger France is than England. The place where the different countries join one another is called the frontier, and this is marked by a dotted line, though usually there is nothing to mark a frontier but an occasional post, unless sometimes, as between France and Spain, a chain of mountains forms a natural frontier



This is, perhaps, the most famous square in Europe. In the days of the Terror it was called the Place de la Revolution ; but it has now been named the Place de la Concorde, or the Place of Peace.

FRANCE IN MODERN TIMES

CONTINUED FROM 2291

THERE are many famous sayings about that beautiful country, "La Belle France," that have come down to us from the lips of those who knew her in the far past. Let us take two of them, that all French children know well, as a guide to our picture of France of modern days.

There was a learned and brave Dutchman named Grotius, who spent much time in France during the reign of the good King Henry IV. and his son—about the time of Queen Elizabeth. When Grotius was asked what he thought of France, he answered earnestly: "France is the most beautiful kingdom there is—after the Kingdom of Heaven."

Then, again, hundreds of years before Grotius said this, there was an old traveler and geographer named Strabo—the first, as far as we know, who tried to give an interesting account of countries, not a mere list of names—who wrote with enthusiasm, when France was still Gaul, about the grand mountain masses in the south and south-east, about the fine spreading rivers, about the seas brought near by a protecting God. "Gaul," said Strabo, "must one day be the most flourishing place on earth." Now let us try to find out what was in the mind of Strabo when he spoke of the bounding seas, the mountain masses, the spreading rivers, and their influence on the future greatness of the country.

It is a wonderful point in the position of France that, though part of a great continent, it has many of the advantages of an island. It can send ships direct across four seas. By way of the North Sea it can trade easily with Germany and the Baltic countries; across the narrow Channel, which the French call La Manche—meaning "the sleeve," from its shape—it has constant and quick communication with England. France is so near to England that more than once the possibility of making a tunnel under the sea from Dover to Calais has been discussed. If this were done trains could carry passengers and goods from either side as easily and quickly as from London to Dorking, or any other journey of twenty miles.

At present one must face a sea voyage, often very rough and unpleasant, lasting about an hour, for they still depend on the service of the various steamer routes which act as links to bind not only England and France closely together, but England to the whole continent of Europe, and to the great

Eastern world beyond. But this communication with the narrow seas is not all. The ports on the west of France face the great Atlantic highway to the New World; and the blue Mediterranean on the south carries not only the commerce of all South Europe and North Africa, but also the fleets of ships taking the direct line to the East by way of the Suez Canal—that first wonderful ship canal, built by a Frenchman.

THE BOUNDARIES OF FRANCE BY LAND AND BY SEA

But France has land frontiers as well as the ever restless, hungry seas. There are the snow-tipped Pyrenees, stretching from the Atlantic to the Mediterranean, still keeping guard between France and Spain. It was in vain that Louis XIV. cried out so triumphantly when his grandson came to the throne of Spain: "The Pyrenees are no more," for the white peaks still look down over the grand passes and green slopes, where shepherds tend their flocks, to France on the north, to Spain on the south.

Thousands and thousands of valuable and heroic French lives have been spent through the centuries in guarding or in trying to extend the land frontiers on the east of France, from the days of Charlemagne to the present day. In many parts, especially in the low lands of Belgium and on the wooded sides of the Vosges Mountains in Germany, the battlefields lie too thick to count. The Jura Mountains separate France from Switzerland, and the great mass of mountainous land south of Lake Geneva lies between France and Italy. This grand country is the western end of the highest land in Europe, which stretches right across Switzerland and the Tyrol to the Danube. The highest peak, Mont Blanc, the white mountain, is in France, and is three and a half times as high as Ben Nevis.

THE FOUR COUNTRIES THAT FRANCE TOUCHES ON HER EASTERN BORDERS

Here, then, are the four countries which France touches on her eastern borders—Belgium, Germany, Switzerland, Italy. On these frontiers were forts and strong towns, and thousands of soldiers were massed in silent watchfulness, even in the days before the Great War broke out. But these frontier barriers were in truth the great outlets by which France was connected with the very heart of Europe. All day and all night trains pass uninterruptedly over the frontiers, from Paris, Lyons, Marseilles, and other great junctions, carrying passengers and goods to every capital and every centre of industry in the wide continent. Lines run down into Spain, by each end of the Pyrenees, near the sea-shore, and even the massive Alps are now no barrier as they were of old; for French skill has pierced the tunnel of Mont Cenis, and the train quickly passes from the land of dazzling snow and glaciers to the land of dazzling sunshine, gay flowers, and blue lakes.

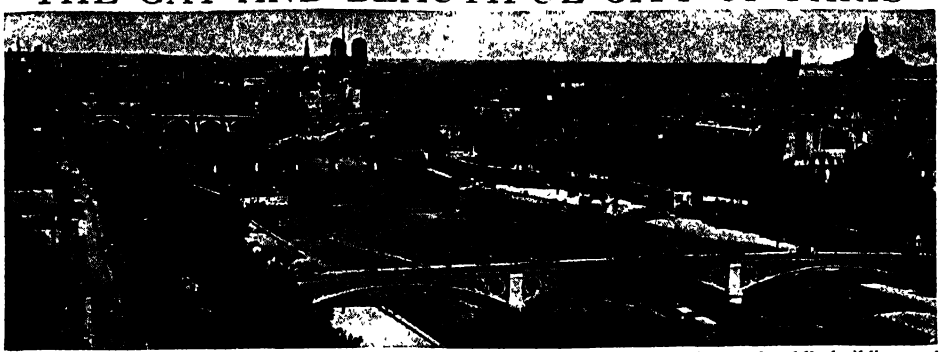
Now, the size of this country thus bounded by sea and land is nearly twice as large as that of Great Britain. The whole of France lies in the middle of the temperate zone, half-way between the icy cold of the North Pole and the burning heat of the equator. Added to the advantage of the moderate climate that this position gives it, it is also neither too damp nor too dry, for the west winds—like those that help England's dairy farming and cotton industry—bring plenty of rain, which in turn is dried up by the land winds from the north-east.

THE GREAT GROUP OF HIGH LANDS IN THE CENTRE OF FRANCE

But we have spoken only of one of the mountain masses mentioned by Strabo. The other is the great central group of high lands which the French call the "Massif Central." This is the most prominent feature in the country, and goes far to make the face of France what it is. The valley of the Rhone separates the "Massif Central" from the "Massif" of the Alps, and a narrow plain separates it from the great chain of the Pyrenees. The Massif Central is not nearly so lofty as the Alps and the Pyrenees, being more nearly the height of the Jura and the Vosges; but it extends over nearly a fifth part of France, forming a most wonderful and beautifully varied country in the old province of lovely Auvergne. The chain of the Cevennes, rising from the Rhone valley, forms part of this central plateau of high land.

In the mountains of Auvergne, we see the fantastic shapes of the old volcanic peaks, which ages ago poured out streams of fiery lava, and clouds of stones and ashes. To-day their "mouths" hold dark lakes, or cattle feeding on soft,

THE GAY AND BEAUTIFUL CITY OF PARIS



No big city in Europe is more beautiful than Paris, with its palaces and churches and public buildings, of which the people are justly proud. Here we have a general view of the city as seen from the Louvre, once a palace, now a famous museum. We are looking along the River Seine towards the cathedral of Notre Dame.



Paris abounds in places of amusement of all kinds, and the leading theatres receive a large sum of money every year from the Government towards their support. It cost over five million dollars to build the lovely Opera House shown here. Standing in the heart of Paris, it is one of the great glories of the capital.



Paris has been made beautiful by being built according to a plan, instead of growing up through centuries, as London did, and this view of the city, taken from the top of the triumphal arch erected to Napoleon, shows how splendidly its builders have laid out its fine, wide streets and avenues, planted with trees.

rich, green grass. The bare, bold granite heights, and deep rifts in which the rivers run 1,500 feet below, make a fine contrast with the fertile lower slopes and valleys. It was in the quiet, smiling valleys of the Cevennes that some of the bitterest persecutions of the Protestants took place in the bad days of Louis XV.

THE GREAT SPREADING RIVERS THAT RUN THROUGH THE VALLEYS OF FRANCE

And now we come to the "spreading rivers." From the great and varied Massif Central, the face of France slopes gently towards the Channel and the Atlantic, forming the vast plains of the north-west and the south-west. Towards the Mediterranean, the slope is steeper. In the large plains lie three out of the four great river systems of France, which spread over it like the veins of leaves; they are the Seine, the Loire, and the Garonne. The hills that rise on the immense plains serve but to give a gentle rise to the otherwise flat country, and to guide the courses of the numerous streams and rivers.

We have already glanced at the Rhone, the most rapid of French rivers, in the part of its course between the Alps and the Cevennes. It rises in the snows of Switzerland, passes through Lake Geneva, and soon after turns sharply south, as it receives the slow Saône from the Vosges. In the angle formed by the meeting of the two rivers lies the great city of Lyons. The Rhone valley has always been the chief highway between the north and south, from the days when the Roman traders and soldiers pushed their way through the forests and swamps to the time when the Marseilles battalion marched to Paris, as told on page 2284, and the Paris and Marseilles coach lumbered along from town to town, after the fashion of our own coaches in the beginning of the last century.

THE LONG RIVER LOIRE AND THE SEINE THAT WINDS SLOWLY TO PARIS

The Rhone forms a marshy delta where it joins the Mediterranean, and there are sandbars across its mouths. Marseilles, the greatest port in France, lies to the east of the delta on the stormy Gulf of Lions—so named after the violence of the storms, not after the city of Lyons.

The Garonne is the other great river of the south, rising in the Pyrenees, and collecting on its right bank numbers of streams from the mountains of Auvergne in the great central highlands. Its waters pour into the Atlantic through a wide and long mouth, called the Gironde, below Bordeaux.

The Loire, the longest of French rivers, three times longer than the Thames, flows in a great semicircle from the Central Mountains, joined on its way by many tributaries; its waters also pour into the Atlantic. Both the Garonne and the Loire are subject to great floods, and dykes are built in many places to prevent the waters bursting over the plains. It is a sad calamity when the flood proves too strong. The fields then all lie under water, and in towns people have to go about in boats; often many are drowned, and their homes destroyed.

The slow, winding Seine—its name means the Tranquil—rises in the hills on the right bank of the Saône, and, joined by the Marne at Paris, flows through Rouen, to the chief port of North France, Le Havre, on the English Channel. It carries more merchandize than any of the other great rivers.

THE WATERWAYS THAT BEAR GOODS FROM ONE END OF FRANCE TO THE OTHER

It is reckoned that France has 150 rivers on which boats of various sizes can carry goods a long way inland, which is a great advantage, as so much of this solid-shaped country is far from the sea. But there are, besides these rivers, hundreds of miles of canals, some connecting or improving the different river systems, some joining the Atlantic and the Mediterranean by the valley of the Garonne, some joining the Rhone, above its delta, with the sea. And so it is that many kinds of heavy goods, for which there is no hurry in transport, can be carried by water from one end of the country to another.

Sometimes the canals go through tunnels in the hills, sometimes they are carried by aqueducts across valleys. It is a strange sight to see a barge with sails crossing by an aqueduct high up in the air. On and on these barges go, on their "inland voyage," day after day, generally drawn by a horse, sometimes taken in tow by a launch, past the banks of blue forget-me-nots; past the groups of laughing children in blue smocks and

PICTURESQUE PEOPLE OF FAIR FRANCE



A fisher-girl of Picardy



A girl of Provence



A Normandy fisher-woman



Peasants of the country round Paris; from "The Gleaners," by the French artist, J. F. Millet.



A Bernardine nun digging



A northern prawn-fisher



A woman of Brittany

The people of different parts of France are very unlike one another. We can see, from the pictures of women of Provence and Normandy, that not only the costumes but the types of faces in the north and south are quite distinct. In Brittany the people speak a different language from the rest of France.

The photographs on these pages are by Messrs. Mansell, Valentine, and the E.N.A.

pinafores, looking like large forget-me-nots themselves; through the cornfields and the orchards and the vineyards and the fine farms so carefully tended; past the villages and the castles, the towns and the great cathedrals.

WHAT THE CHILDREN SEE FROM THE BOATS AS THEY SAIL ALONG

Truly, the families of the bargees can learn what is grown in France, what the people do in France, without looking in books. They see that wheat is grown nearly everywhere, for France produces in her great plains more than any other country, except the United States and Russia, and many thousands of men and women work in the fields to raise it, in the mills to grind it, in the barges and trains to carry it where it is needed. Still, there is not enough to feed all the people, and more must be brought from other countries.

The bargees, too, see much of the vineyards all along the courses of the Loire and the Garonne, and in the district east of Paris, called La Champagne. There are also great numbers of vineyards all along the Saône and the Rhone, and on the Mediterranean coast. France not only uses a great quantity of wine at home, for it is much cheaper than with us, but sends away all over the world many different kinds. Thousands of workers gather and press the grapes, make casks and bottles, and attend to all the various processes necessary before the wine is ready.

In the valley of the Rhone also grow mulberry-trees, which feed great numbers of silkworms, and so at Lyons and in the neighborhood are many factories, which send out their famous silks, satins, ribbons, velvets, to every country where fine materials for clothes and furnishing are needed. The factories also get supplies of raw silk from Italy and from the East.

THE COALFIELDS AND THE FACTORIES THAT THEY FEED WITH POWER

Round the edge of the central highlands are coalfields, of which the largest, St. Etienne, near Lyons, supplies the silk factories. As some iron and other metals are also found here and there about the same districts, there are various industries carried on, such as the making of tools and machinery. But the canals, and railway lines, too, lie thickest in the north-east of France, and many barges used to pass to and from the largest coalfield of the country, situated on the borders of Belgium. France only produces two-thirds of the coal needed in the country; the rest she buys from Great Britain and the United States. She also had to buy iron and other metals needed at Lille, the chief town of a large district of tall chimneys and black smoke, with a deafening whiz and whir of machinery, and crowds of workers, all reminding us of our manufacturing centres at home. Here are iron and steel works, and linen and cotton factories. These industries are carried on all along the north-eastern frontier, Nancy and Belfort being particularly famed for cotton and metal works.

The raw cotton from America and other places comes to Le Havre, at the mouth of the Seine, which is often called the Liverpool of France, and from it are supplied Rouen, the Manchester of France, where there are many cotton factories, and also the rest of the cotton towns in the north and east.

THE MAKING OF THE THINGS THAT FILL THE SHOP WINDOWS IN PARIS

The linen from these districts is made chiefly from flax grown in the fields of the north. Great quantities of the blue cotton and linen materials worn so much in France are made in these mills. To supplement the wool of the sheep grown on the Ardennes and in French pastures, supplies come by way of England from Australia and New Zealand, and from South America, to feed the various woolen factories of the north and east.

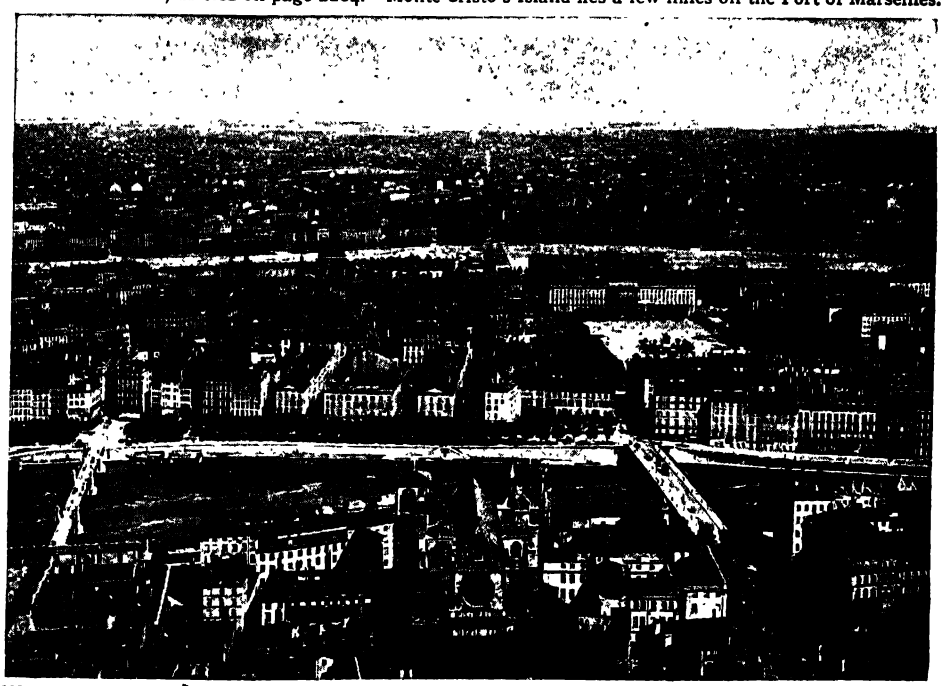
From the old decaying granite of the Massif Central comes kaolin, from which the finest china is made, though sometimes it is found easier to bring this special white clay up the Seine from the granite of Cornwall and Norway. At Sèvres, near Paris, and at Limoges, near Auvergne, most beautiful china is made. The French are particularly skilful in painting the shining surface. They also make very pretty peasant pottery, which costs about as many cents as the fine china does dollars.

But to see samples of the numberless things made in France, we must look into the shop windows of Paris. Thousands of other nations go to Paris—it takes only seven and a half hours from London—and everyone can find something of interest and delight in this

TWO FAMOUS OLD CITIES OF FRANCE



The greatest commercial city of France is Marseilles, on the Mediterranean Sea, built on slopes overlooking the old harbor seen in this picture. Crowning the hill is the church of Notre Dame, which sailors like visiting. It was from Marseilles that men and women marched to Paris and largely influenced the cause of the Revolution, as told on page 2284. Monte Cristo's Island lies a few miles off the Port of Marseilles.



While Marseilles is the third great city of France, the city of Lyons comes next to Paris, and is the second. Its great extent may be seen from this birdseye view. It is built where two rivers, the Rhone and the Saône, meet, and the most important part of the city is on the narrow strip between these rivers.

splendid city. There are about half as many people in Paris as in New York; the river running through the city is clean, and there are scarcely any fogs.

THE TREASURES OF PARIS AND THE PLEASURES OF ITS STREETS

Visitors who love history can find endless pleasure in wandering about the streets and squares, the bridges and palaces, where great events moved so quickly a hundred years ago. Those who love art can find splendid treasures in the museums and galleries. And as for the shops, besides the china, there is the wonderful and costly lace made in various parts of the country, the finest muslins and cambrics, the brocades and velvets from Lyons, the cloths from Amiens, the clocks and jewelry, of which a good deal is made in the neighborhood of Paris, as well as the thousands of things that people buy for presents. Paris fashions in clothes are famed all the world over, and dressmakers and milliners come from other countries to find out what is going to be worn, and to copy the latest and smartest styles for their customers at home.

From this rich and beautiful city of Paris—one is apt to forget the great lines of fortifications round it, making it the largest fortified camp in the world—radiate not only the great roads of France, but nearly all the chief railway lines; for Paris is the very centre of the trade and industry of France, a sort of living heart, whose pulse-beats are felt to the farthest frontiers by means of the great arteries of roads, waterways, and railways. A railway train requires only about five hours to reach Lille and the district of which it is the centre, from Paris, and the lines pass on through Belgium and Germany to Holland, Austria, Russia. Another branch of the railway passes, through Amiens, where we may see the most perfect cathedral in France, to Boulogne and Calais.

THE RAILWAY FROM PARIS TO THE SEA, AND THE SHIPS AT MARSEILLES

The east of France down to the Mediterranean is served by the Paris-Lyons-Mediterranean Railway. The main line follows the old route through the Rhone valley, passing Lyons and Avignon, where the splendid palace of the Popes still speaks of the times when this city and its neighborhood belonged to the Roman Church. Marseilles itself, the queen of the south, is a great world-port; every language is heard in its streets, from the sailors who bring ships there. Marseilles is one of the chief markets in France, and has factories for tile-making, soap, and oil. Through Marseilles passes French trade with the Far East, with the New World, with Africa, and, nearer still, steamers link it to the island of Corsica, about half the size of Wales, which passed to France from Italy the year before the birth of its greatest son, Napoleon Bonaparte.

Thousands of Americans pass through Paris and Marseilles, not only on their way to Egypt and the East, but to spend the winter in the beautiful coast district between Marseilles and Italy — the Riviera. They leave fogs, snow, and cold winds behind in their own country, and in the course of a few days—fourteen hours from Paris to Marseilles—pass to warm sunshine in a bright, clear air, under a blue sky, and can sit out of doors, facing the blue sea, enjoying the scent of roses and the sight of brilliant patches of geraniums, as well as the beauty of orange and lemon orchards and olive groves.

THE SPLENDOR OF THE OLD TOWNS OF SOUTHERN FRANCE

Nice is one of the largest and most fashionable of the Riviera towns, and all nations of Europe gather here to find health and to amuse themselves. Fine scents and soaps come from this part of France and the best salad oil from olives.

The line of the south does not run to Paris, but connects the Atlantic with the Mediterranean, along the valley of the Garonne and its canals. There are towns in this part of France of surpassing interest. Toulouse is a splendid city of churches and mansions, with a museum and a fine library. It is at the meeting of the ways for commerce and industry of all kinds. Carcassonne is also on this line, and on the canal of the south; its strong walls still tell of its importance in the old days when it was the key to the narrow passage between the Massif Central and the Pyrenees. The wonderful cathedral of Albi, so lofty and grand, is but one among the great number of cathedrals found all over France, the undying glory of those who

built them in the Middle Ages, and the delight of all who in later days love art and architecture.

To go from Cette, on the Mediterranean, to Bordeaux, the great wine port of the west, takes eleven hours of railway traveling, and lines branch off to many health resorts in the Pyrenees, and to Spain. Bordeaux is reached from Paris in about ten hours, passing Orleans, Tours—the garden of France—and Poitiers on the way.

Normandy and Brittany are served by the railway of the west. Cherbourg, the great naval and military port of the Channel, on the bold Cotentin peninsula, is reached in eight hours from Paris. Many German and English liners touch here on their way to and from America. Like Plymouth, it has a great breakwater to protect its harbor. Another naval and military port, Brest, on this line, at the extreme west of France, is five hours farther from Paris.

NORMANDY AND BRITTANY, AND THE GREAT SEAPORTS OF FRANCE

Le Havre, the second port in France, is about six hours from Paris by rail. The tall lighthouse above the town looks down on a busy scene of ships and docks, for the Seine is the great northern door into the country, and by it goods are taken to Rouen, and to distant Paris. We can see the cotton for the factories unloaded on the wharves of Rouen, under the shadow of the great churches for which it is so famous. And on the heights overlooking the windings of the "tranquil" river, in the fine, wide valley, stands the statue of Joan of Arc.

English people travel much in Normandy, which is so close to England; the seaside places are charming, and the long, tree-bordered roads are good for cycling. The cathedrals and churches are full of interest, and the apple orchards are a beautiful sight in their white spring dress. It is most interesting to watch the cider being made in the presses by the roadside in autumn. Over the wide-spreading valleys, in both Normandy and Picardy, grow fields of beetroot, so much used to make sugar; also great quantities of potatoes, largely sent to England. From Le Havre pass out millions of eggs, and tons of butter and cheese from the dairy farms of the north. A gay sight it is on market days in Normandy and Brittany, when the country folk crowd into the towns to buy and sell. Such pretty white caps and shining ornaments there are, such red and blue umbrellas, glowing brass pots full of milk, and such loud, animated talking. The serious-looking babies in close white caps seem the only quiet people.

THE CLATTER OF THE CHILDREN'S SHOES, AND THE BLUE SMOCKS AND BLOUSES

Perhaps the first morning you wake up in France you will wonder what causes that clatter, clatter, clatter over the stones. You look out and see merry little crowds of children, boys and girls, in blue smocks and blouses, the girls with hair very neatly plaited, all hastening to school, with their satchels on their backs. The clatter is from the wooden shoes, or sabots, that many of them wear. They are like the clogs of the Lancashire mill-workers, whose ancestors, it is said, got the pattern of the clogs from the French Huguenots, who did so much to help on the spinning and weaving in England when they left their native land for that country.

The French care a great deal about education, and have built fine schools all over the country. There are all sorts of schools, and all have an equal chance of getting the teaching their brains are best fitted to grasp. Every Frenchman over twenty-one shares in the government of his country; he has a voice in choosing the men who are to fill the important posts in his district and department, and to represent these again in the Chamber of Deputies—something like our House of Representatives—in Paris.

THE EIGHTY-SIX PARTS OF FRANCE AND THEIR MANY KINDS OF PEOPLE

So the greatest trouble is taken to teach the children to be good citizens, and to know their mother country well, her resources and her needs, and to understand what their brothers and sisters are doing in the eighty-six departments of France. Those departments were formed at the Revolution from the old provinces, so that the same fair laws and government should prevail equally all over the country. When we consider how wide is the country, of how many different provinces it is composed, how separated these different parts were till better government, education, and the railways drew

them together, we shall find it easy to understand how it is that there are so many types of people and dialects in France.

DIFFERENCES IN LANGUAGE AND CUSTOMS IN FRANCE

You see, therefore, that the French people are descended from almost as many races as there are now represented in the United States and Canada. Their descendants have of course mingled together and become one people; but they have many different characteristics in the different parts of the country. If we were to travel down the coast of France, we should find that the inhabitants of Normandy, which was peopled by the Northmen, are not at all like the people of Brittany, which was settled by the ancient Britons, and the Gascons, who live on the shore of the Bay of Biscay, at the foot of the Pyrenees, which made the last stronghold of the Iberians, have a special character of their own. In the matter of language there are still great differences. Originally all these people spoke different languages and the dialect, or patois, of one part of the country is still quite distinct from that of other parts. Although French is, of course, taught in the schools the people of Brittany still speak their old language, which is the same as that of the Welsh, and indeed if a Welshman and a Briton were to speak to one another in their native languages they could understand each other. The people in the North, near the Belgian frontier, are very like the Belgians, and are quite different from the people of Marseilles and Avignon, and the people of these towns differ from the peasants of the "Landes," near Bordeaux, where the herdsmen walk about on stilts in the damp, heavy sands of the plain on which they pasture their flocks and herds and their geese.

It is natural that all these people should have had different ways of living, and many quaint superstitions and customs still survive. These customs are slowly dying out, however, and before long most of them will have disappeared.

But in spite of all their difference there is one point on which there is no lack of unity among the French people and that is their intensely passionate love of their beautiful country. The instant she is attacked, from north and south, east and west, they rise as one man to defend her. They will bear any privation, and are ready at any moment to sacrifice themselves and all they have for her sake. In time of peace, every man who reaches the age of twenty, unless he is unfit either because he is not strong enough or because there is something wrong with his mind, must serve in the army. The term of service is three years, and from this full term there is no escape.

MANY PEASANT OWNERS OF THE LAND IN FRANCE

Though there are many large cities in France the people do not readily take to town life, and nearly half the population is engaged in agriculture. Much of the land is owned by the peasantry, who hold farms of from five to fifty acres, and the man who owns fifty acres of good land is very well off indeed. On these small farms a good deal of work is done by hand, and in some places agriculture is still very primitive. The people are slow to give up their old ways, but of late years new machinery has been introduced, the state supports agricultural schools and colleges, and improved ways of farming are taking the place of the old.

Even in the manufacturing parts of the country, the people are not prone to gather into the large factories. Many of the beautiful textiles that come to us from France are made by cottage workers, some of whom, since the introduction of electricity, have been able to increase the amount of their business by using the new power looms.

The people, as a rule, live simply, and as the French are as a general thing very thrifty, most of them are able to save. Their thriftiness sometimes becomes miserliness, but there are few, even among very poor people, who are not able to lay something away for their old age. It is because of the thrifty habits of the whole people, that France has again and again been able to turn disaster into prosperity.

We must not let ourselves think, however, that the French devote themselves only to farming and manufactures. Among this great people there are not only some of the greatest painters and sculptors, architects and writers in the world, but France has also given to the world some of the greatest scientists and philosophers of all time and of our own day. You will find some of their names mentioned with honor in the BOOK OF MEN AND WOMEN.

HOW THE PEOPLE OF FRANCE ARE GOVERNED

Although France is a republic, the government is not quite like the government of the United States. In some ways it is more like the government of England. The president is elected for seven years, and he may be re-elected for a second term, but he has not very much real power. He sends his messages to the legislature in writing, although every recent president has been a member either of the Senate or of the Chamber of Deputies, and does not lose his seat on his election to the presidency. He has the power to negotiate treaties, and even in some cases to ratify them, but they must in all cases be reported to the legislature as soon as possible, and he cannot declare war without the consent of both the houses. He has the power to dissolve the Chamber of Deputies, but only on the advice of the Senate, and every one of his acts must be signed by a minister. He also has the power of pardoning offenders against the law.

You see the power of the president is well hedged round. The real ruler is the prime minister. Since the date of the Constitution, however, no prime minister has ever stayed in office during the four years for which the Chamber of Deputies is elected.

The Constitution does not decree that the members of the cabinet must be members of the legislature; but as a matter of practice, the majority of them are. The Minister of War is usually an officer in the army, and the Minister of Marine an officer in the navy. Sometimes the Minister of Foreign Affairs is called in from the outside, but the rule is that the other cabinet ministers are either senators or deputies, and under the Constitution they are responsible to the legislature for their acts. If the majority of the Chamber of Deputies does not uphold the cabinet on any question, the prime minister is expected to resign. The president then appoints a new prime minister, who proceeds to form a new cabinet. Each appointment must be signed by a minister as well as by the president, and when the ministry changes, a member of the old cabinet stays in office long enough to sign the appointment of the new prime minister.

Changes of ministry have happened so often that a government sometimes goes out of power before a year has passed, but the president cannot be put out of office before his term has expired unless he is impeached by the Lower House, tried by the Senate and found guilty. One president, however, who became very unpopular, was forced to resign because he could find no one to serve in his cabinet.

The legislature is composed of two houses, the Chamber of Deputies and the Senate. The deputies must be twenty-five years old, are elected by manhood suffrage vote and serve for four years. Members of the Senate are elected by the deputies of the department that they are to represent, the members of the council of the department, the members of the local councils, and a delegate from each commune, which corresponds somewhat to our township. Each senator serves for a term of nine years, but one third of the Senate is elected every three years, so that the whole body never goes out of office at one time. For the election of the president, the two houses sit together in what is called the National Assembly, and the candidate who receives the majority of their votes is elected. He receives about $120,000 a year as salary, and as much more for expenses. He is also provided with an official residence by the state. The senators and deputies are each paid the same salary of about $3,000 a year.

There is nothing in France that corresponds to the state or provincial government of the United States and Canada. The councils of the departments are appointed by the government, and so are the governors, who are called prefects. Each department is subdivided into arrondissements. The councils of the arrondissements are elected; but these councils are presided over by sub-prefects, who are appointed by the government; and the council has to do with little except local taxation. The councils of the commune, which transact local affairs, are also elected and these local councils are presided over by the *maires*, who are also the local police officers, and are directly responsible to the government, for maintenance of the laws by the people.

THE GREAT COLONIAL EMPIRE OF THE FRENCH

France has a great colonial empire. In Africa, as we read in the story of that continent, Algiers and Tunis, the Desert

of Sahara, and a great part of the fruitful western coast are under her rule, and part of Morocco is under her protection. She has large possessions in the Congo, Madagascar belongs to her, and she owns part of Somaliland on the borders of the Red Sea.

In Asia, she has large possessions to the south of China, and in America, she still holds part of Guiana on the northern coast of South America, a few of the West India Islands, and the small islands of St. Pierre and Miquelon off the coast of Newfoundland.

FRENCH PEOPLE ARE NOT GOOD COLONISTS

But the love of country is so intense among the French that they do not willingly go abroad even to their own colonies, and consequently the colonies are not prosperous. They do a good deal for the education of the native people of the colonies, but they do not go to live there. This is true of even Algiers and Tunis, which lie across the Mediterranean, almost at the door of Southern France. These two colonies, however, come nearer to being prosperous than any of the others. The climate of both is delightful. They can be made true garden spots, and already they provide quantities of early fruit, flowers and vegetables for the markets of Northern France and England.

Perhaps one of the reasons why the French are not enthusiastic about going to live in their colonies is that they have not been forced out by the necessity of earning a living. The population of France has been at a standstill for many years, and until her people increase in number, she cannot send out many strong, young men to make her colonies prosperous children of the motherland.

Since the time of the Franco-Prussian War, France has gained steadily in importance, and has become a great power in the councils of the world. Since the time of Napoleon III France and England, who had for so long been enemies, have been friends, and the agreement between them has helped both nations. Once it seemed as though they might have a quarrel over Africa. As we read in the story of Africa, a French captain, named Marchand, tried to establish French possession in the Sudan and cut communication between Egypt and the Upper Nile. For a little while it looked as though the French legislature would uphold him, in which case there would have been war, but happily for the world, wiser counsels prevailed. Later on all the old sources of contention between the two nations were removed, and the friendship between them became stronger as time went on.

Twice within a few years afterward there was danger of a quarrel with Germany, over Morocco, part of which had been drawn under French influence; but in each case the other powers took the part of France, Germany was forced to give way, and the trouble passed over.

At home, there were many quarrels. Education, which had always been in the hands of the religious orders, was taken over by the state, most of the orders were dispersed, and the care of the church buildings was taken from the clergy, and all this created much bad feeling. There were many political difficulties and some bad strikes; but on the whole the country was peaceful and prosperous. Commerce and manufactures increased, great dominions were gained in Africa, science and education advanced and friendship with other nations was cultivated. The friendship between France, England and Russia became so close that it was called an *entente cordiale,* and the alliance which had been signed between France and Russia provided that if either nation were attacked the other would come to its rescue. There had been disputes with Spain over Morocco, but these had been settled, and good feeling between Italy and France grew up.

THE BEGINNING OF THE GREAT WAR

In 1914 France presented the picture of a civilized, cultured nation, at peace with all the world. But in that year Germany, which was about to go to war with Russia, invaded France and the Great War which plunged the whole world into war began.

The northern and northeastern parts of France, where many of the great manufactures had been established, were overrun in the war, by the invading Germans. The beautiful old towns and cities were destroyed, the country was torn up, and the sufferings that the people endured while they were under the rule of their enemies can never be told.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2549.

WHAT THIS STORY TELLS US

A WORLD without fire would be a world of savages. How men first got fire we do not know. Perhaps it was from a volcano, or from a fire set by lightning. At first, after men had learned the value of fire, they did not dare let it go out, and when they moved from one place to another, they carried burning coals with them. Next they learned to get fire by rubbing pieces of wood together, and then by sparks from flint and metal. Next came rude matches, which were expensive and dangerous, but which have been improved until we can now carry them in the pocket with perfect safety, and can get fire in a moment without trouble. The story and the pictures show you how matches are made by the million from logs and a few chemicals. If you will follow the story you can see why it is now possible to buy a thousand matches for a few cents. Made by hand, they would be very expensive, and we should have to think twice before using one.

HOW MATCHES ARE MADE

CONTINUED FROM 2337

IF you were ever on a picnic, or in camp, and suddenly found that the matches had been left behind, or had got wet and refused to strike, you quickly realized how much we depend upon these little pieces of wood with their crackling heads. They are so common and so cheap that we often forget what a convenience they are. Yet the world got along without matches for thousands of years; for the first real matches, something like those we have to-day, were made less than a hundred years ago.

When our ancestors first began to use fire to cook their food or to keep them warm, a central fire was kept burning all the time, so we are told. Certain persons were appointed to tend it, and see that it did not go out for want of fuel, or because of the rain. From this central fire the different families would take a burning branch to kindle separate fires to cook their food. When the tribe moved the fire was carried along too. It is not strange that many savages worshiped the dancing tongues of flame, which were so mysterious and so terrible and yet so useful.

HOW OUR ANCESTORS MADE FIRE WITHOUT MATCHES

We know that some savages used to get fire, and still get it, by rubbing two pieces of dry wood together in different ways. This method is difficult, and not every one can learn the knack of doing it. Men found an easier way after they learned the use of iron and steel. If a flint is struck sharply on a piece of steel, sparks fly off, and will set some very dry substance on fire. The muskets used in the Revolutionary War were called flintlocks, because they used this idea. A little hole was bored through the barrel, and a few grains of powder were shaken out on the edge. A flint attached to the hammer, or lock of the gun, struck a piece of steel, when the trigger was pulled, and the sparks set the powder outside on fire, and the flame exploded the powder inside the barrel.

WHAT IS MEANT BY A TINDER-BOX, OR FLINT AND STEEL

Before the Revolution, and long afterwards, many houses had tinder-boxes, which contained some flints, a piece of steel, and some rags which had been baked until they were very dry. When a fire was wanted, sparks were struck into a bit of the tinder, as the half-burned rags were called. This would smolder, and, by blowing, tiny splinters could be lighted and soon there would be a roaring fire of logs in the great fireplace. Sometimes very dry rotten wood was used instead

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of tinder. You may have seen a piece of punk, which holds fire a long time. Usually, however, the coals were covered with ashes at night so that they would keep alive. Sometimes this was forgotten, or perhaps the family went away from home for a few days, and the fire went out. If the house did not own a tinder-box, or if there was no tinder prepared, some one took an iron pot and went to a neighbor's house to get some live coals.

How matches got rid of all this trouble

Now we get rid of all this trouble by using a match, and do not care very much if we must use two or three. This has not been true very long. The first matches made were very expensive, and were considered a great luxury. Your grandfather or grandmother can tell you of the time when either there were no matches, or when they were too scarce to be used freely.

A man named Godfrey Haukwitz almost made a match as long ago as 1680. In 1805, a man in Paris coated bits of wood with sulphur and tipped them with a little chlorate of potash mixed with sugar. When he wanted a light he dipped the tip into a bottle of sulphuric acid, and the combination caught on fire. Sulphuric acid, however, will eat through clothing, or burn the skin, and so this plan was found to be too clumsy and too dangerous for common use. The next matches were made in another way.

The first real matches were made by John Walker, an Englishman. They were tipped with antimony and potash, and with every box a sheet of folded sandpaper was furnished. The match was placed in the fold, which was tightly pressed together with one hand, and the match was jerked with the other. Sometimes the match caught on fire. You know that rubbing or friction produces heat. This is the secret of the match, to find some substance or substances which will flame from the heat produced by rubbing against a rough substance and yet will not be too dangerous to use. Some of these early matches are shown on pages 810 and 811.

Phosphorus, which flames at a low heat

Phosphorus had been discovered long before, but it catches on fire with very little heat, and was thought to be too dangerous to use for this purpose. It is poisonous besides. It was found, however, that by mixing the phosphorus with other substances, a match could be made that would strike easily and yet was not likely to flame unless rubbed purposely. Several men found this out about the same time, for we find this same John Walker, and men in Germany and Austria making phosphorus matches in 1833. Matches were made in Springfield, Massachusetts, in 1836.

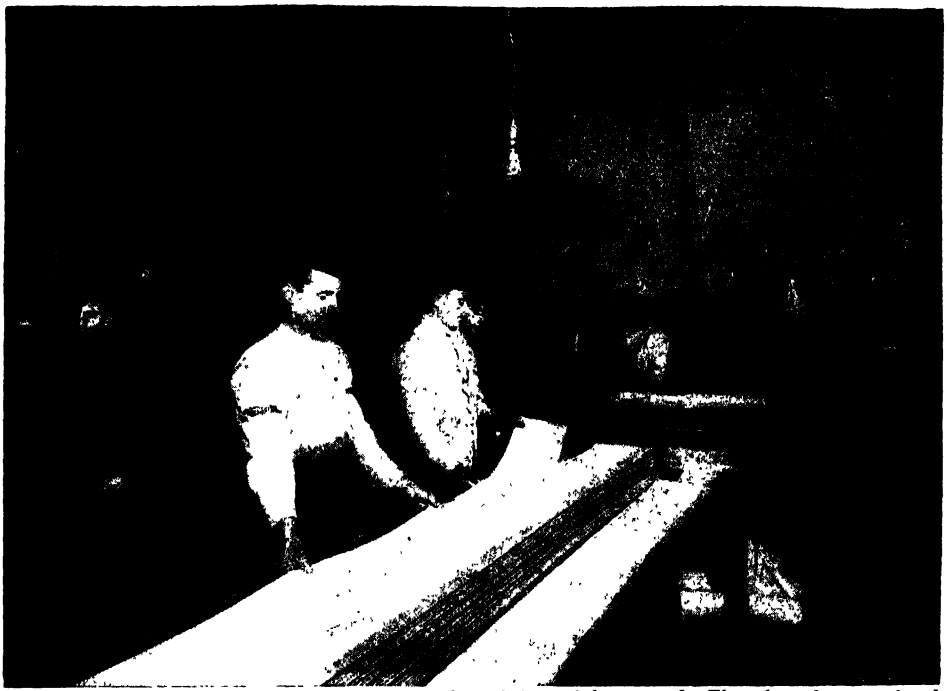
The body or stick of a match is usually a small strip of wood, but sometimes it is a tiny wick of cotton, stiffened with wax. You have seen the beautiful little matches, which the English call vestas. We often see strips of cardboard used in little books of matches which the tobacco shop gives away. The substances in the head of a match are not always the same. Different manufacturers use different mixtures. There is always phosphorus in ordinary matches. Sulphur, nitre, lead, manganese and potash are used by different manufacturers. The double-dip or "bird's-eye" match has a tiny striking tip, but the most of the head is made of some substance which burns easily and gives a good flame. Matches made for use at the seaside, or where the wind blows strongly, have very large heads and burn quite slowly.

How costly fires have been caused by matches

The ordinary matches used years ago did not catch on fire by themselves, but did cause many fires by rubbing together, or by being stepped upon or by being nibbled by rats or mice. Sometimes a whole box in a man's pocket would catch on fire, if he pressed against a wall or the arm of a chair. About 1852, safety matches were made by J. E. Lundstrom, in Sweden. There is no phosphorus in the heads of these matches, but a certain kind of phosphorus is painted on the box. They will strike only on the box, or upon a glassy surface, and therefore are much safer than ordinary matches. Now they are made in many parts of the world, and no other sort of matches should be carried in the pocket, unless one uses a metal match-box.

Years ago workers in match-factories were often attacked by a peculiar disease. The white phosphorus used attacked the

MAKING STICKS FOR THE MATCHES



Logs of selected basswood are cut into proper lengths and the bark is removed. These logs then are placed in these machines, which peel off sheets just the thickness of a match. As it leaves the machine each sheet is cut into strips. The men inspect the strips and tear out the parts which contain knots or imperfect places. Machines like these are also used in making veneering to cover up cheaper wood in furniture.



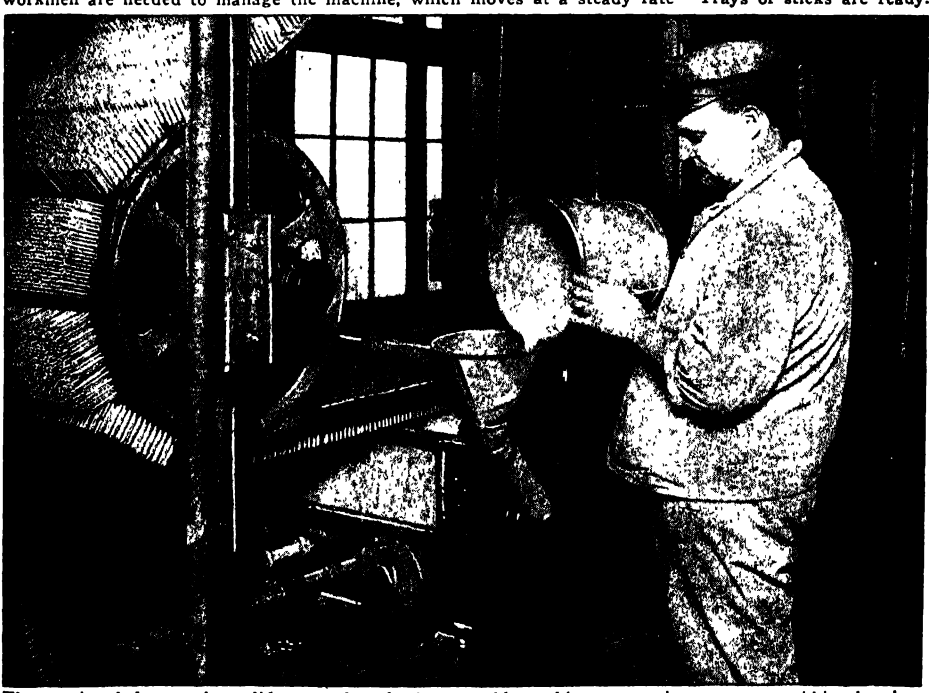
The sheets of veneer then go to these machines, which cut them into the proper length for a match, and split them into the sticks you see here. The trays fill very rapidly, as the sticks tumble out. They are next dried in a kiln, and then go to a machine not shown, which arranges them so that they lie side by side.

All pictures of matches copyright by Brown Bros.

THE STICKS START ON A JOURNEY

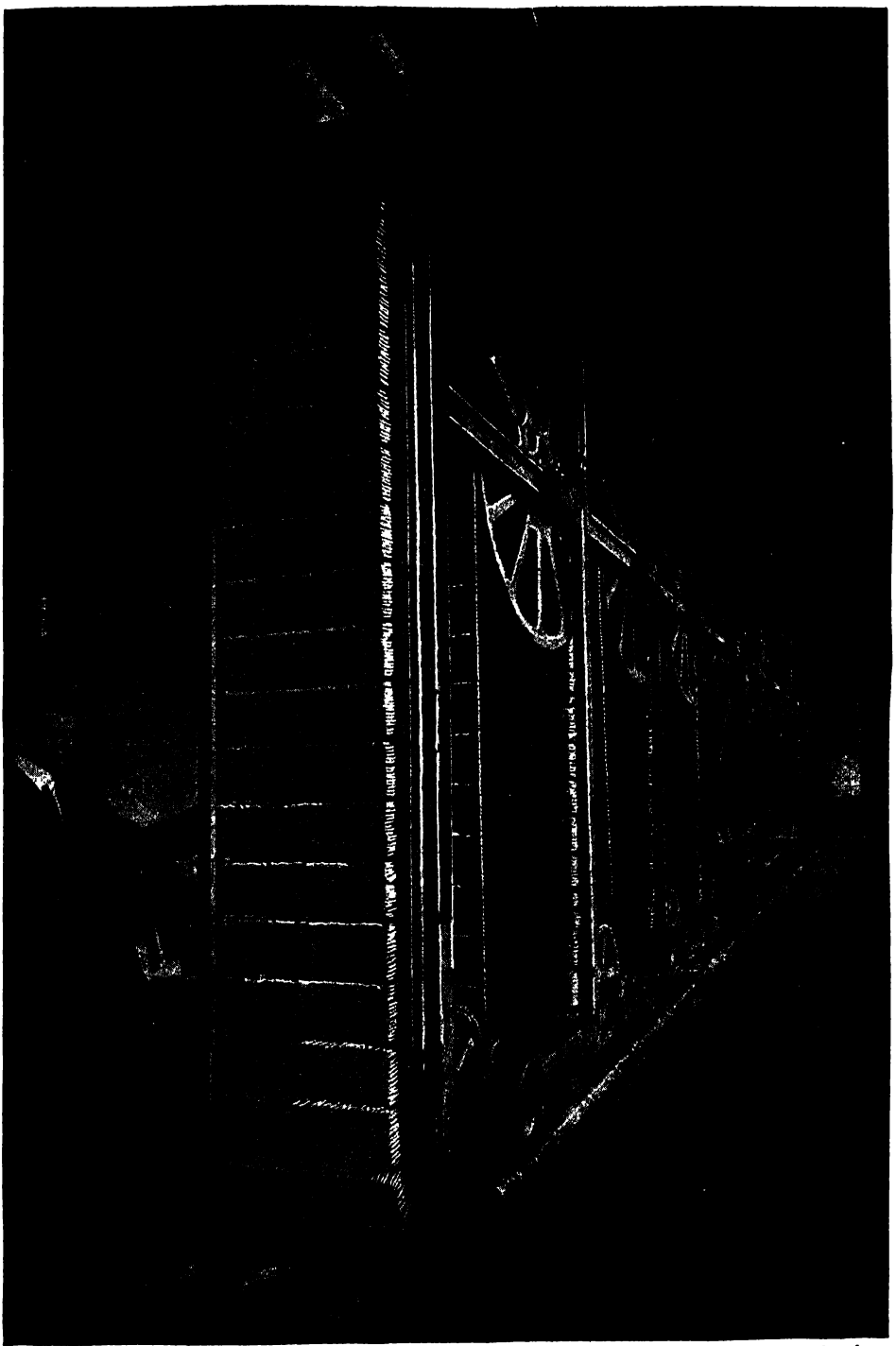


The match-sticks now are brought in trays to a great machine which seems to be almost intelligent. Here each stick is shaken and pushed into a tiny hole in the crossbar of an endless belt. They are now ready to start on their journey through this machine, from which they are to come out perfect matches. Few workmen are needed to manage the machine, which moves at a steady rate Trays of sticks are ready.



The moving belts, as they glide over the wheels, resemble nothing so much as great scrubbing-brushes. Here you see a man pouring composition of some sort into a tank. The roller in the tank revolves and touches each stick as it passes. The end of each stick must be dipped into other mixtures before it comes out a perfect match. The machine holds two million match-sticks at one time.

MAKING TWO MILLION MATCHES



This great machine twelve feet high and eighty-eight feet long can make twenty-four million matches in a single day. The sticks are first wet with a substance to prevent them from glowing after they are blown out and then in paraffin to make them burn easily. Next they take up a little of the substance which makes the head flame, and then the tiny tip which strikes fire when rubbed. Currents of air dry the tips.

THE PERFECT MATCHES COME OUT



Here we see the completed matches being removed from the machine. After being dipped in the various mixtures, currents of warm air have been blown upon them, and they are now perfectly dry, and ready to go to the packing-room to be placed in boxes. A perfect match can be turned out in fifty-five minutes after the log has been placed in the veneering machine, and the knives begin to peel off the sheets of veneer.



At the left you see a roll of cardboard which is fed into this machine, which prints any words desired upon it, cuts it into proper lengths, bends the piece into shape, glues it together and paints some sand and glue on the side. The result is the outer part of a match-box ready for use. This machine can turn out five hundred boxes every minute. The box which slides into the cover is made in another way.

teeth and the bones of the jaw, and caused great suffering. Now the use of white phosphorus is not allowed, but a harmless red phosphorus is used instead.

WHAT YOU MAY SEE IN A MATCH FACTORY

The pictures will show how matches are made. Logs of wood are cut into a convenient length, and set into a machine which peels off a continuous ribbon of wood exactly the thickness of a match. Another machine cuts these ribbons into the proper length and chops them up into match-sticks, which are then dried. They are then arranged evenly and placed in the dipping machine, which looks like a whole series of great revolving scrubbing brushes arranged on a long belt, as you see in the pictures.

You know that a piece of wood sometimes glows for some time after the flame has gone. If match-sticks did this after they were tossed aside many fires might result. The sticks are therefore dipped into alum-water, or some such thing. This dipping does not keep the stick from burning, but it does prevent it from showing a red coal after it has been blown out. The sticks, or splints, as they pass along, are dipped into melted paraffin, which is the same substance of which many candles are made. This makes the splints catch on fire easily when the head blazes.

HOW THE HEAD OF A MATCH IS FORMED

The splints are now ready for the heads. The belt moves the great brushes along, and the ends of the splints dip into tanks which hold the mixtures used by the particular manufacturer. The sticks stand apart, and each splint takes up a little drop of the mixture and forms a little head for each one. You may have seen two matches in a box stuck together. This happens when one of the sticks leans against another. In making some matches, the head is dipped twice. The machine is so long that the heads have time to harden before they are taken out of the machine and carried to the packers. Matches which strike anywhere must be packed by hand, for a machine might press the heads too roughly and cause a fire of thousands of matches.



Machinery cannot do quite everything. Ordinary matches must be packed by hand, or a bad fire might result. The nimble fingers of the girls gather up the right number of matches, place them in one part of a box, and slip on the outer part which you saw being made. Safety matches can be packed by a machine.

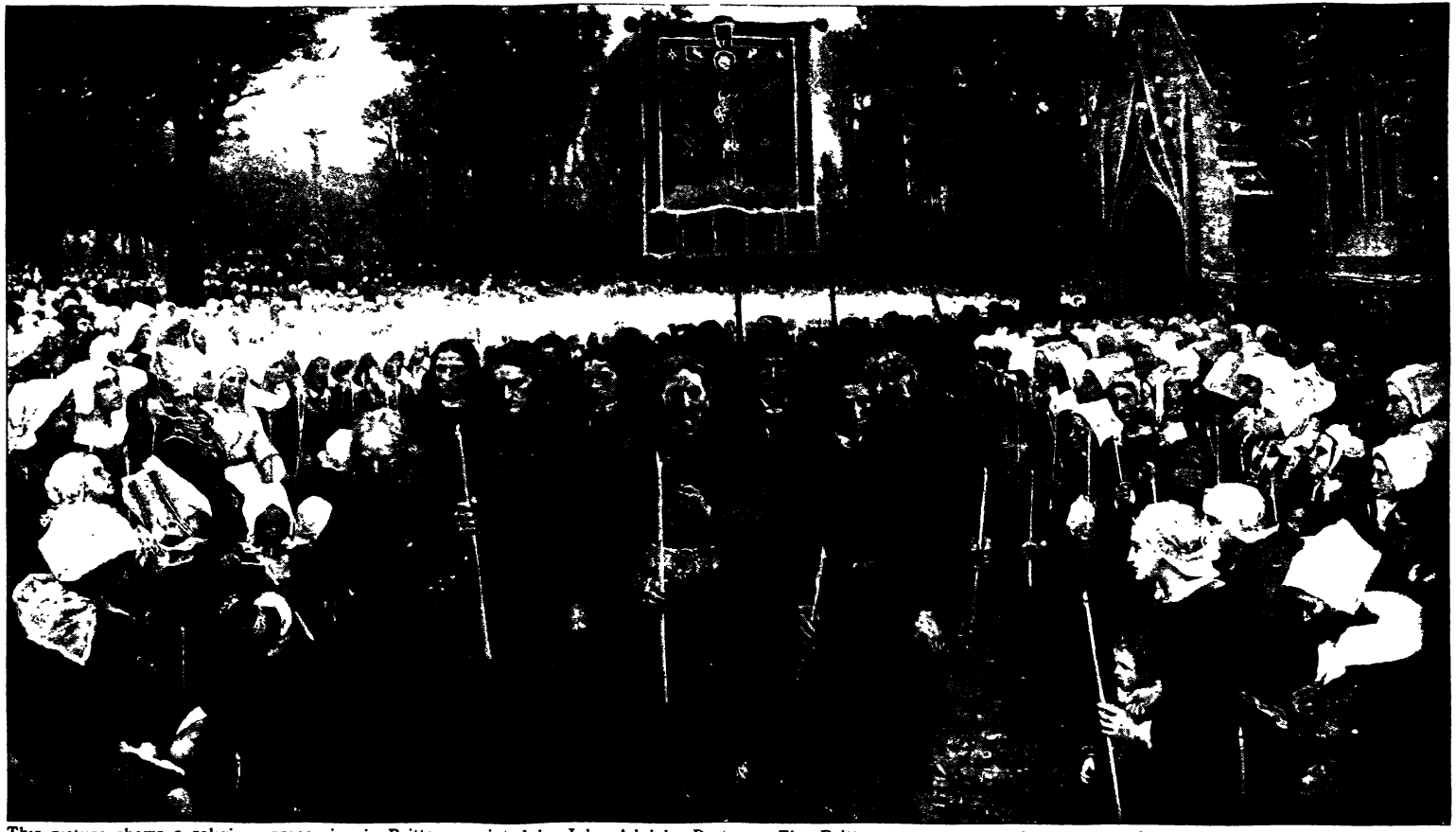
THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 2525.

HENRY CLAY ADDRESSES THE SENATE OF THE UNITED STATES



This famous engraving represents Henry Clay addressing the United States Senate on the Compromise of 1850, which he hoped would settle forever the dispute between the North and the South over slavery. Vice-President Fillmore is presiding and Calhoun, at that time a very sick man, stands at his left. Webster, with his head resting on his hand, is seated behind Clay. The other faces are also portraits of the Senators of the time. The Compromise, as we know, did not end the disagreement.

A RELIGIOUS PROCESSION IN BRITTANY



This picture shows a religious procession in Brittany, painted by Jules Adolphe Breton. The Brittany peasants are descendants of the old Gauls, and many strange legends still retain their hold on their minds and their religion. On each saint's fête day a pilgrimage or pardon is celebrated. Here is a band of peasants at Kergoat beginning a pilgrimage. Note the quaint costumes of the men and the white caps of the women, looking like a garden of flowers.



THE CAPITOL BEFORE THE CIVIL WAR

SOME AMERICAN STATESMEN

CONTINUED FROM 2329



IN other parts of our book we have told of many great Americans. Some were statesmen, some were sailors or soldiers, and others showed their greatness in many different occupations or professions. In our stories of the history of the United States we could not tell of all the great men who had a share in building the nation, and in this story we shall say something of a few of the great statesmen.

We might call John Smith the first American statesman. He really understood something about the way that a state must be governed, and he was almost the only man in the Virginia colony who did understand; but he remained in America such a short time that we shall go on to another colonial statesman.

JOHN WINTHROP, FIRST GOVERNOR OF MASSACHUSETTS BAY

The name of John Winthrop is highly honored in New England, as the greatest man in the history of the Massachusetts Bay Colony. He was born in England, in 1588, was educated at Cambridge University and became a lawyer. Though successful in his profession he was not happy in England, for he was a strong Puritan, and did not like the management of religious or state affairs at that time. He determined to move to New England, and was elected governor of the colony which landed in Massachusetts in 1630. Until his death, in 1649, he was governor or deputy governor nearly all the time, and gave his strength of body and mind and will to keep the little colony on the right path. Some of the old Puritans were very stubborn and it was sometimes difficult to prevent them from doing unwise things. Through his influence a sort of union of the New England colonies was formed for defence against the Indians or other foes.

Governor Winthrop was married four times and had many children. One of his sons, also called John, was almost as important in Connecticut as his father was in Massachusetts.

BENJAMIN FRANKLIN, ONE OF THE WISEST MEN OF HIS TIME

The next man of whom we speak belongs partly to colonial days and partly to the United States. This is Benjamin Franklin, who was famous as author, scientist, inventor, business man and statesman. We tell something of his deeds in other volumes. He was born in Boston in 1706, and was the fifteenth child and the tenth son of his mother. His father was a poor candlemaker, but the boy became a printer under his brother. They could not agree, and when seventeen

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years old the boy ran away, and found work in Philadelphia. He spent some time in London, but returned to Philadelphia, opened a shop of his own, bought a newspaper, and became a prominent citizen. Through him the police and the fire departments, a library and an academy were organized. He invented a stove which warmed the rooms with less coal, and performed experiments with electricity, which we described in another place.

He was postmaster of Philadelphia for a time, and later Postmaster General for all the colonies. He formed a plan of union for the colonies, which was not adopted, however, went to England to represent Pennsylvania, and remained there as the representative of all the colonies. He helped to draw up the Declaration of Independence, was sent to France to persuade the French to help the states to gain their liberty, and succeeded in getting money, arms, and men. His simple manners and his wit made him a favorite in Paris. He was at the head of the government of Pennsylvania for three years, and helped to make the Constitution of the United States. He died in 1790 after a busy and useful life. His Autobiography is often read in schools as a specimen of good English, and his Poor Richard's Almanac, full of wise sayings, was very popular when published and is still read.

TWO MEN OFTEN MENTIONED TOGETHER

Alexander Hamilton and Thomas Jefferson are often mentioned together in the history of the United States. This is not because they were so much alike, but because they were so different in their ideas and their lives. We tell you of Jefferson, the Virginian, in another place. Hamilton was born on the island of Nevis in the West Indies in 1757, but came to New York while still a boy and soon entered King's College, now Columbia. He was very much interested in the disagreement between the colonies and Great Britain, and won a great reputation by his writings and speeches, while he was only a boy.

When only nineteen years old, young Hamilton was appointed captain of a company of artillery. He soon attracted the attention of Washington, and became his secretary, but resigned near the end of the war, because he felt that Washington had been unjust to him. At Yorktown he led one of the attacking columns.

After the Revolution, he was a member of Congress for a little while, but soon began to practise law, and was very successful. He saw very clearly the weakness of the government set up under the Articles of Confederation, and urged a stronger government. He was a member of the convention which made the Constitution of the United States, and his writings had much to do with making people agree to accept the new instrument of government.

When the new government began, it had no money and no way to get it. The country owed a great deal at home and abroad, and no one could see how the debts were to be paid. President Washington appointed Hamilton to the new office of Secretary of the Treasury, and he at once set to work to find ways to get money. He was wonderfully successful, and soon the new government had money enough, though some people grumbled at the taxes.

The salaries paid by the new government were small, and Hamilton, who had married the daughter of General Philip Schuyler, and had several children, felt that he must make more money for his family. He resigned his office in 1795, and returned to New York, but continued to take great interest in politics. During the administration of John Adams, he had more influence in the nation than the president himself.

You remember that, in 1800, Jefferson and Aaron Burr got the same number of votes, and so the choice was with the House of Representatives. Hamilton did not like Jefferson, but he felt that he was a better man than Burr, and advised all his friends to vote for Jefferson, though some of them wished to vote for Burr. Jefferson was chosen president and Burr vice-president. Burr felt that he had lost the presidency because of Hamilton, and the latter also opposed his desire to be elected governor of New York. Burr challenged him to a duel in 1804, for in those days men often fought to settle their quarrels. Though Hamilton's son had been killed in a duel only a little while before, he accepted, and a meeting took place, July 11, 1804, at Weehawken, New Jersey, just across the river from New York. Hamilton was mortally wounded and died the next day.

Few men have done more for the United States than this man, though we do not to-day believe in all of his ideas. He did not think that the people could govern themselves, and thought that only men of property and education should vote. He thought that the president and the senators ought to hold office for life, and did not believe in allowing the states to keep much power. He deeply loved his country, and served it with all his strength, and his name will be long remembered.

ANOTHER FOREIGNER WHO HELD HIGH OFFICE

Another great statesman, who was born about the same time, was also a foreigner. This was Albert Gallatin, born in Switzerland in 1761, and also educated there. He came to Boston just as the Revolutionary War was coming to an end, and went into business. He failed, and then taught French in Harvard College for a little while. He did not feel happy in New England, however, and moved to western Pennsylvania, then almost a wilderness. The young Swiss was afraid of a strong government and tried to prevent his state from accepting the Constitution of the United States, but did not succeed.

Though he could not yet speak good English, he was sent to the Pennsylvania legislature, and was even sent to the United States Senate in 1793. There was a dispute about the length of time he had been a citizen, and he was not allowed to remain in the Senate. His state sent him back to the House of Representatives, and there he became the leader of the new Republican party which Jefferson was founding, and when that great man became president, he made Gallatin Secretary of the Treasury.

Gallatin believed that the business of a state should be conducted like that of a family. He thought that a state should pay back all borrowed money as soon as possible, just as a family would do. Therefore he set himself to pay off the debt of the United States, and for twelve years worked to do it. All his plans were broken up by the War of 1812, and he went to Europe in 1813, to try to bring about peace. He did not succeed at first, but he was one of the men who made the Treaty of Ghent, which ended the war.

President Madison gave him the choice of becoming Minister to France, or of taking his old place as head of the Treasury. He chose the former and remained in France seven years. He was talked of for vice-president in 1824, but was not a candidate, and in 1826 was sent to England as Minister. He did not stay long, but came back to New York, and became president of a bank. As he did not have very much work to do, he gave most of his time to the study of the Indian tribes. To the end of his life, in 1849, he was always ready to give his advice and help in all questions of government.

A DISTINGUISHED SON OF A BRILLIANT MOTHER

The next American of whom we shall speak, was born in 1767, in Massachusetts, where his ancestors had lived from the first years of that colony. His father was John Adams, the second president, and his mother was Abigail Smith, of whom we tell in Famous Ladies of the White House. The boy was called John Quincy, in honor of his mother's grandfather, and soon showed that he had a remarkable mind. His father was sent to England by Congress in 1778, and the boy went along, but kept up his studies in Paris and Leyden. In 1781, when only fourteen years old, he was appointed private secretary to the Minister to Russia, but soon returned to Paris and acted as one of the secretaries of the men who were making a treaty of peace between the United States and Great Britain. When that task was completed he returned home and entered Harvard College.

After his graduation from Harvard, in 1787, at the age of twenty, he studied law, but Washington sent him as Minister to the Netherlands in 1794, and later he was transferred to Prussia. On his return to the United States he became United States Senator from Massachusetts in 1803. The next office was that of Minister to Russia, and then he was one of the men who made the treaty of peace with Great Britain after the War of 1812.

It seemed that the country could not get along without him, and he was sent to London as United States Minister, but was recalled to become Secretary of State under President Monroe. He had had all these honors before he was fifty years old. In the State Department he served eight years, and won great fame.

He managed the purchase of Florida

from Spain, the discussion of the fisheries disputes with England, and the argument about the Oregon question. The most important thing he did was to write a few paragraphs in one of President Monroe's messages which we now know as the "Monroe Doctrine." You are told what this means in another part of our book.

In 1824, he was elected President of the United States, but many things prevented him from being a success. In the election no candidate got a majority of the votes, and General Andrew Jackson received more than Adams. The House of Representatives chose Adams, and all of Jackson's friends were angry. Then, too, President Adams liked to have his own way and did not get along with Congress, which refused to do the things he advised. He was again a candidate in 1828, but was badly beaten, and went out of office in 1829.

How President Adams Spent His Last Years

Mr. Adams was now sixty-two years of age; he had lived a very busy life, and had held the highest offices his country could give. Many men would have been glad to retire, and live a life of ease. Mr. Adams did not think of such a thing. Though he had been United States Senator, Secretary of State and President, he took a seat in the House of Representatives in 1831, and was re-elected term after term until his death.

He spoke on every question that interested him, and spoke so well that he was called "The Old Man Eloquent." His chief work was directed against slavery, and he always said what he really thought. In 1848, he had a paralytic stroke on the floor of the House and died two days later at the age of eighty-one. No man in all our history served his country more faithfully

Three Men Usually Mentioned Together

Now we come to three men who are often spoken of together, because they were in public life at the same time, and had great influence in the nation. All of them served in both houses of Congress, all held Cabinet offices, two were candidates for president, and one was twice elected vice-president. These men were Henry Clay, of Kentucky; John C. Calhoun, of South Carolina; and Daniel Webster, of Massachusetts.

Henry Clay was the oldest and came first into notice. He was born in Virginia, in 1777, during the Revolution, and went to work as a clerk in Richmond, at the age of fourteen. As he was very intelligent and wrote a good hand, a distinguished judge employed him as a sort of secretary. After studying law a little while, he was given permission to practise when only twenty years of age, and moved to the new state of Kentucky. His power of making friends was very great, and he was soon successful both in law and in politics.

Before he was really old enough, he was appointed to fill a vacancy in the United States Senate. This time he served only a few months, but was again appointed for a short time in 1809. He now determined to go into politics in earnest. In 1811, he became a member of the House of Representatives, and was at once elected Speaker. In another place we have told of the trouble with Great Britain about American ships and sailors. Jefferson and Madison had tried to avoid war, but Clay, Calhoun and other young men favored war so strongly, that they were called "The War Hawks." After the war he was a member of the commission which arranged a treaty of peace.

Clay Arranges the Missouri Compromise

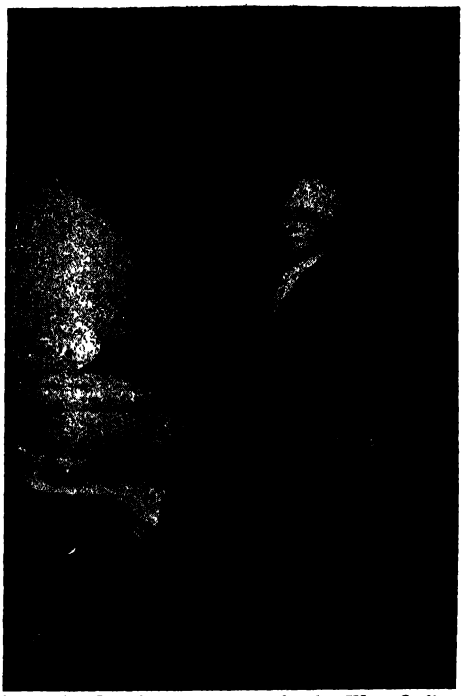
While a member of the House he arranged the Missouri Compromise, about which you can read in the History of the United States, and in 1824 was a candidate for president, but was defeated. During John Quincy Adams' administration he served as Secretary of State, but in 1831 again became a member of the United States Senate, where he gained his greatest fame. He was again a candidate for president in 1832, but was defeated by Andrew Jackson. He resigned in 1842, but was the Whig candidate for president in 1844, against James K. Polk. He was again elected to the Senate in 1848, and served until his death in 1852.

During his long service Clay was noted for two things. He was a strong advocate of a tariff to keep out foreign goods, so that all the articles we needed might be manufactured in the United States. This policy he called the "American System." He is even more noted for his efforts to settle differences of opinion which threatened to break up the Union.

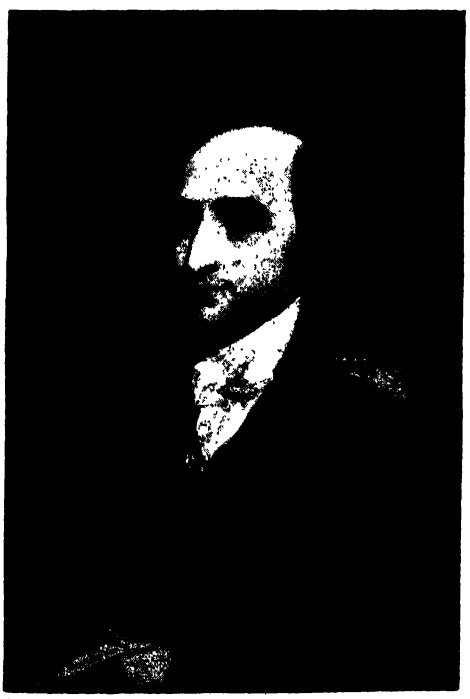
STATESMEN OF THE EARLY DAYS



Benjamin Franklin was statesman, diplomat, author, inventor, and with it all a shrewd and able business man. He signed both the Declaration of Independence and the Constitution of the United States.



Alexander Hamilton was born in the West Indies, but came to the United States when only a boy. He won his greatest fame as Secretary of the Treasury. He was killed in a duel with Aaron Burr.



Albert Gallatin was a Swiss by birth, but soon became a good American. He was Secretary of the Treasury under President Jefferson and made a great record. Later in life he was a banker.



John Quincy Adams is the only President of the United States whose father had held the office before him. He held other high places in the government, and died while a member of Congress.

In 1821, in 1833, and again in 1850, he came forward with plans which both sides accepted, and gained the title of the "Great Pacificator."

No man in our history has been so much loved as Clay, but he failed to gain the presidency, which he desired above all things. Though a candidate three times, there was always some special reason for his defeat. Once, when told that some act of his would lose the presidency, he said, "I would rather be right than president." This is a noble sentiment which every one of our readers should remember.

JOHN C. CALHOUN, VICE-PRESIDENT AND SENATOR

Though John C. Calhoun had a greater mind than Clay, he did not have such power to gain the affections of men. He was born in South Carolina in 1782, and when twenty years of age entered the junior class of Yale College, and was graduated with high honors two years later. After studying law in Connecticut, and in South Carolina, he began to practise, but was soon sent to the legislature of South Carolina, and then to the United States House of Representatives, where he favored a declaration of war against Great Britain. In 1817, he became Secretary of War under President Monroe, and made a fine record. He was elected to the vice-presidency in 1825, under John Quincy Adams, and was re-elected. He quarreled with President Jackson, however, and resigned in 1832, before the end of his term.

We have already told in another place of the objection of South Carolina to the high tariff laws of 1828 and 1832. Though Calhoun had favored a protective tariff in 1816, he had come to believe that such laws were unconstitutional, and that they would ruin the South. He declared that a state had the right to decide whether a law was wrong, and could refuse to obey it. This is called "Nullification." As soon as he resigned the vice-presidency he was sent to the United States Senate, and there spoke for what he thought were the interests of the South. For nearly a year, in 1844 and 1845, he was Secretary of State under President Tyler, and helped to bring Texas into the Union.

As soon as he left this office, he was again sent to the United States Senate, and remained there until his death, though his health and strength were failing fast. He died in 1850, while the question of admitting California to the Union was before the Senate.

This statesman saw earlier than most of the men of his day that the Union could not continue part slave and part free unless the states had more power than the national government. If Congress tried to make laws upon the question of slavery, there was sure to be trouble. Calhoun loved the South, and, in 1849, spoke of "dissolving the partnership," that is, breaking up the Union, as necessary if the rights of the South were trampled upon. He loved the Union, but he loved the South more.

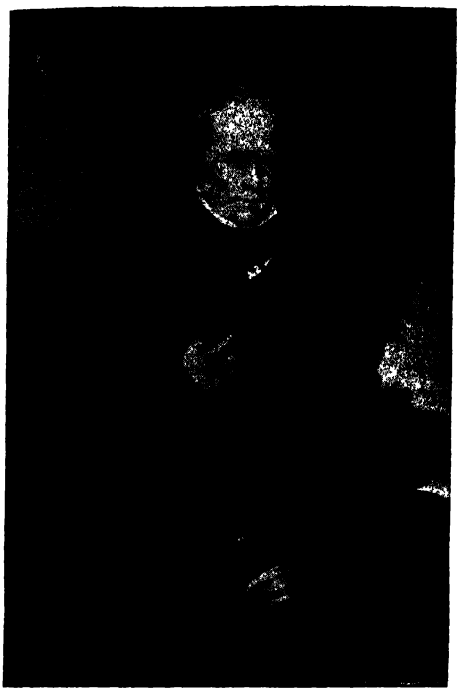
DANIEL WEBSTER, THE EXPOUNDER OF THE CONSTITUTION

We have said that Clay was a great orator and Calhoun a great thinker. Now we come to a man who was both an orator and a thinker. Daniel Webster was born on a small farm in New Hampshire, in 1782, the same year that his great opponent, John C. Calhoun, was born in South Carolina. He was a delicate child, and so eager to learn that his father, a soldier of the Revolution, determined to send him to college. In 1797, he entered Dartmouth College, then a small, struggling institution, and was graduated four years later.

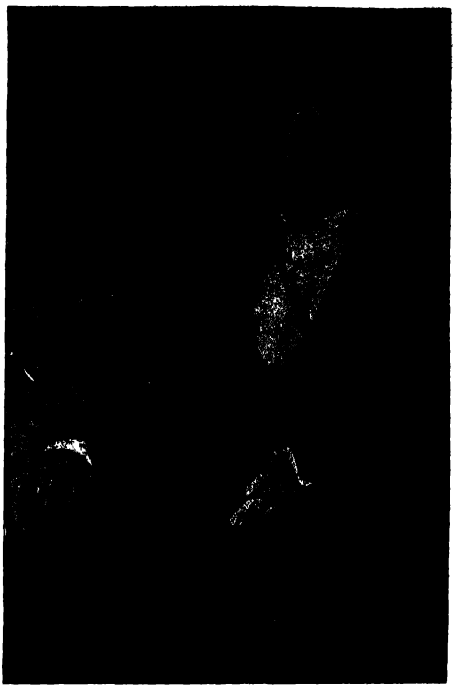
Like so many young men of the time, he taught school, but also studied law, and in 1805, began to practise in a little village near his home. Soon he removed to Portsmouth, then a flourishing town, and, in 1812, was elected to the United States House of Representatives, and was re-elected. During his second term he decided to move to Boston, where there were greater opportunities for a lawyer. While in Congress he opposed the War of 1812, as the people of New England felt that it was harmful to that section. Soon after he removed to Boston, the people began to speak of sending him to Congress from Massachusetts, in 1822, he was again elected to the House of Representatives, and remained until he was elected to the Senate in 1827. From that time until his death he was a member of the Senate, or else Secretary of State nearly all the time.

While telling you of Calhoun, we spoke of the dissatisfaction of South Carolina at the tariff laws. One of the Senators from South Carolina, Robert Y. Hayne,

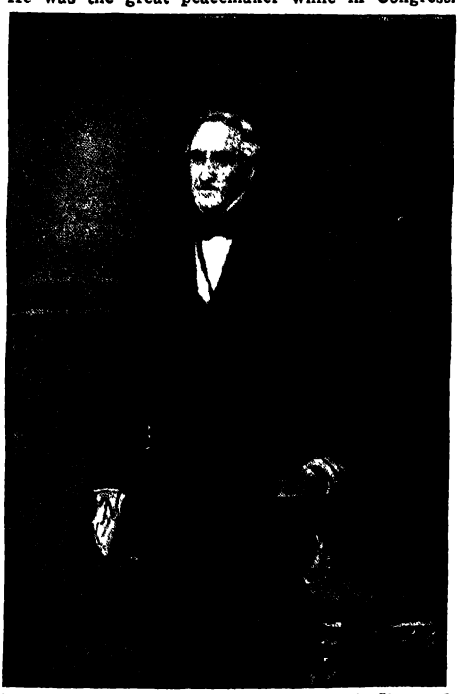
STATESMEN OF THE MIDDLE PERIOD



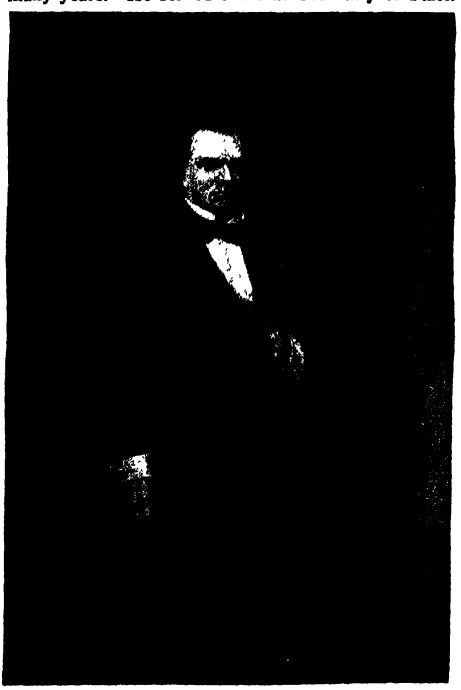
Henry Clay was one of the best loved and most influential men ever in public life in the United States, but he failed to realize his ambition to be president. He was the great peacemaker while in Congress.



Daniel Webster, the greatest orator of his time, though born in New Hampshire, moved to Massachusetts and represented that state in the Senate for many years. He served twice as Secretary of State.



Thomas H. Benton sat in the Senate with Clay and Webster, but opposed them in politics. He was a member of the Senate for thirty years, and wrote a large book telling what he had seen there.



Stephen A. Douglas was called the "Little Giant." He introduced the Kansas-Nebraska Bill, and was defeated for the presidency by Abraham Lincoln. He was only five feet tall, but seemed much taller.

made a speech in which he said that New England had always been unfair to the South and the West, and that the Union might be broken up if those sections were not better treated. He also said that the Union was simply an agreement between the states, and that any state had a right to leave the Union or to refuse to obey unjust laws.

Senator Webster replied in a speech four hours long, in which he defended New England, and declared that the Union could not be dissolved. His speech closed with the words: "Liberty and Union, now and forever, one and inseparable." This famous speech, called "The Reply to Hayne," is known to every schoolboy.

In 1841, Mr. Webster became Secretary of State under President Harrison, and continued in office for a time under President Tyler. The most important thing he did was to make a treaty with Great Britain which settled the boundary between Maine and Canada. After the treaty had been signed, Mr. Webster resigned and went back to the law. He had bought a farm in Marshfield, near Boston, and loved to spend much time there.

He always spent a great deal of money, and while in Washington, had gone into debt. He wished to practise law, for which he could get large fees, so that he would not be troubled about money, but the people of Massachusetts again sent him to the Senate in 1845. He accepted, as he hoped to be elected President of the United States, but in this he failed, as Clay had also done.

His last great speech was made in 1850, when he favored the Compromise of 1850. Some of the New England people were opposed to making any compromise with slavery, and Mr. Webster was much abused for his "Seventh of March Speech." While he was not a friend to slavery, he loved the Union and wished to preserve it at any cost. Before the Compromise had passed, President Fillmore offered him the position of Secretary of State, and for a second time he took that great office. He was already a sick man, and it was well that no great question came up while he was in office. In 1852, the Whig party nominated General Scott for president. A party always wishes to win, and always nominates the man whom the leaders think can get the most votes. Mr. Webster had made enemies during his long service, and the leaders thought that a military hero might get more votes. This is the reason why many of our greatest men have never been chosen to head the nation.

Mr. Webster was much disappointed, and only a few days before the election he died at his beloved Marshfield. He had had a wonderful life. From a poor New Hampshire farm he had gone on to high position in the nation. He was looked upon as the greatest lawyer and orator of his time. He had gained everything except that which he most desired.

A MAN WHO WAS SENATOR FOR THIRTY YEARS

Another statesman, who was in the Senate with Webster, Clay and Calhoun, and had great influence there, was Thomas Hart Benton. He was born in North Carolina in 1782, and attended the State University for a little while. His father died early, and his mother moved to Tennessee, where the young man studied law, and was soon elected to the legislature. He volunteered during the War of 1812, but saw no fighting.

Missouri was then growing rapidly and the ambitious young lawyer moved to St. Louis in 1815. He edited a paper, had many quarrels and fought several duels, but made many friends. When Missouri was admitted as a state according to the Missouri Compromise, he was chosen one of the first Senators and served five terms, thirty years. Few men have served so long as this.

In the Senate he took a prominent place, though the measures he favored did not always become laws. For example he wished to have the President of the United States elected directly by the people, and he was much opposed to paper money. He believed that only metal should be used as money, and was often called "Old Bullion" for this reason. He favored building a railway to the Pacific, and he also favored giving farms to the people instead of selling public lands. Both of these things were done after he had left the Senate. When many men did not think the United States should gain more territory, Senator Benton believed in going to the Pacific.

Though he had quarreled with Andrew Jackson before he left Tennessee, they

became friends again. While Jackson was president, Senator Benton was one of his strongest supporters. In some things they were much alike. Both were Western men, and though both held slaves, they hated men who were willing to break up the Union on account of slavery. Because he grew to believe that slavery should not be extended into some of the new western lands, he was finally defeated, and retired in 1851.

He had held office so long that he could not be happy as a private citizen. He was elected to the House of Representatives in 1852, but because of his views on slavery served only one term. Then he was a candidate for governor of Missouri in 1856, but he had lost his popularity and his defeat broke his heart.

STEPHEN ARNOLD DOUGLAS, "THE LITTLE GIANT"

Another Western man was younger than any of these, but was almost as important. This was Stephen Arnold Douglas, who was born in Vermont in 1813. His father died soon after the birth of the boy, and at the age of fourteen he was apprenticed to a cabinet-maker. He was determined to do something else, and soon began the study of law. The West seemed to offer a better chance, and he moved to Illinois in 1833, and began to practise law. He made many friends and held several small offices. When only twenty-eight years old he became judge of the Supreme Court of the state.

He found his place when he became a member of the United States House of Representatives in 1843. In spite of his youth he at once became prominent. He, like Benton, believed that the United States should extend its territory, but, unlike him, was willing to go to war with Great Britain over the Oregon country. He also favored a railroad to the Pacific.

From 1847 until his death he was a member of the Senate, where he was known as the "Little Giant," for he was only five feet tall. In the Senate he spoke on many questions, but the measure for which he is chiefly remembered was the Kansas-Nebraska Bill, about which you may read in another place. He believed that the people of a territory ought to decide important questions like slavery for themselves.

Though Senator Douglas owned no slaves himself, his wife, a North Carolina woman, owned some, and the new Republican party, which was growing in Illinois, wished to defeat him for the Senate. Abraham Lincoln was put up as the candidate against him, as you may read in our story of Lincoln in another place, but Douglas was re-elected.

In 1860 he was nominated for the presidency, by the Northern Democrats, but the Southern Democrats nominated another man, and for this reason Lincoln was elected. Douglas loved the Union, and opposed the efforts of the Southerners to break it up. He did everything he could to help President Lincoln, but died in 1861, before war really began.

WILLIAM H. SEWARD, A FOUNDER OF THE REPUBLICAN PARTY

We have told you much of Abraham Lincoln in other parts of our book, and now shall speak of one of his helpers. This was William H. Seward, who was born in Orange County, New York, in 1801. He was graduated from Union College in 1820, studied law, and began to practise in 1822. Soon he was elected to the legislature, and became governor of New York at the early age of thirty-seven. He was elected to the United States Senate as a Whig in 1849, and re-elected in 1855, but his dislike of slavery finally led him to help to organize the new Republican party.

Most people expected him to be the Republican candidate for president in 1860, but Abraham Lincoln was chosen instead. President Lincoln at once made Mr. Seward Secretary of State, and in this office he served until 1869. He was always loyal to his chiefs, and managed the foreign affairs of the country with much skill. Besides much difficult business with Great Britain, he got the French out of Mexico and purchased Alaska from Russia. When Lincoln was assassinated, an attempt was made to kill him as he lay sick in bed. After leaving office, he made a trip to Alaska and then went around the world. He died in 1872.

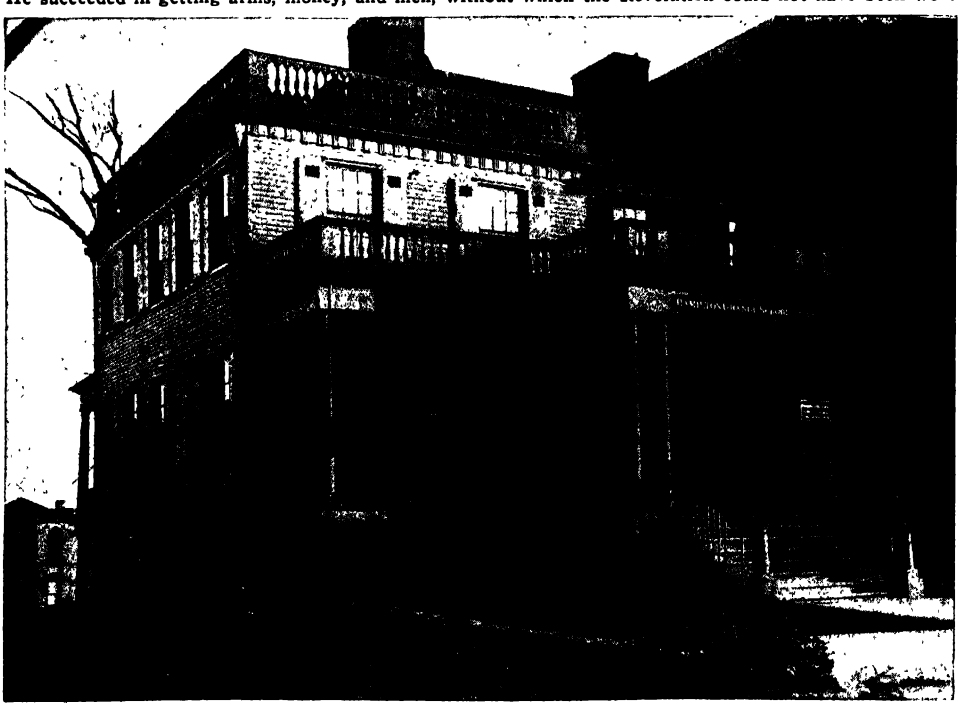
These are a few of the men of the past who deserve to be held in honor by young Americans. There are many more, besides the men of recent times. We can not find space to tell you of all the men who have held high positions during the past fifty years, even if we were sure which of them are really great.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 2487.

FRANKLIN AT THE FRENCH COURT



When Benjamin Franklin was the minister of the thirteen states at the French court, his simple manners, quaint speech, and ready wit made him a favorite with the frivolous and the wise alike. Here he is being crowned with a laurel wreath. He did not object to anything by which he might make a friend for America. He succeeded in getting arms, money, and men, without which the Revolution could not have been won.



Alexander Hamilton built for himself a country house outside of New York, which he called Hamilton Grange, after the residence of the family in Scotland. Though it has been twice moved it now stands within sight of the original location. The city has long since reached the house and now goes on far beyond it, but it was miles out in the country then. At present it is at 141st Street and Convent Avenue.



THE FRIEND OF COLUMBUS

CONTINUED FROM 2348

QUEEN ISABELLA OF CASTILE was not only one of the ablest of queens, but one of the most generous of women.

Peter Martyr, a man who lived in her palace and knew her well, wrote to the Archbishop of Granada on the day of her death: "My hand falls powerless by my side from very sorrow. The world has lost its noblest ornament. She was the mirror of every virtue, the shield of the innocent, and an avenging sword to the wicked."

Isabella was Queen of Castile in her own right, and by her marriage with Ferdinand, King of Aragon, the two kingdoms were united, and have ever since remained parts of Spain.

For one thing the whole world will ever be grateful to Isabella of Castile. In pity for the sufferings of the wounded, she paid surgeons to go with the army and care for the soldiers hurt on the field of battle. Six roomy tents, called "The Queen's Hospital," were supplied with beds and all appliances that the rough surgery of those days had in use. Thus it is to the kind heart of this good woman that we owe the first camp hospital for use in war.

Many stories are told of the queen's generosity, piety, humility, and wise plans for the good of the people over whom she ruled. She once saw a bull-fight, and though she could not make the people give up the brutal national amusement, she refused to be present at another unless the sharp horns of the bulls were guarded to prevent injury to the beasts.

Perhaps Queen Isabella's name is best known to American boys and girls as the friend and helper of Columbus. She and her husband believed at first that Columbus was merely a needy adventurer and sent him away. The statesman Santangel, however, came to his help, and then the queen was won over. She no longer hesitated, but entered warmly into the question of ways and means, declaring she would undertake the matter for her own country of Castile, and that she would even pawn her jewels to pay the expenses of the expedition. Santangel was much pleased at the queen's offer, but said it was not necessary for her to pawn her jewels.

Columbus was at once brought back into the royal presence. On April 17, 1492, Ferdinand and Isabella made an agreement with him to undertake the voyage westward.

The story of the wonderful venture and what Columbus found is told elsewhere. It was like the good queen to refuse to allow the people in America to be brought to Spain as slaves, and she made some captains who brought over cargoes of them take them back to their own homes.

THE GIRL WHO SAW THE TSAR

ABOUT a hundred years ago a Russian officer offended the Tsar, and was banished with a number of other exiles to a cold and dreary place in the north of Siberia. The prisoners went through all manner of hardships, but this Russian officer was allowed to take with him his wife and little daughter, Prascovia; so that he was saved the agony of separation from them.

Life to the exile in Siberia was a rough and hard one, and as the years went by, and hope of pardon grew less and less, it was sad for the parents to watch their little daughter growing a big, untaught girl in such rough surroundings. Seeing her father so unhappy, Prascovia was unhappy, too; and then one day, when she was nearly fifteen years old, the idea flashed into her mind that she ought to go to Petrograd and beg the Tsar to pardon her father.

Could she do it? To walk all those dreary hundreds and hundreds of miles to Russia! Would her father and mother consent to let her try? Anxiously, with beating heart, she told her father what it was in her mind to do. But he only smiled at the idea of his young daughter venturing on such a mad errand.

THE LONG JOURNEY WHICH BEGAN AFTER A LONG, LONG WAITING

Three years went by, and little Prascovia was growing helpful and womanly. She had never forgotten her cherished plan, and she put it before her father again. This time her father and mother listened to her, but begged her not to think of leaving them for such a dangerous venture. But Prascovia got another exile to write a request for a passport, and in six months that passport reached her.

Now that the way was open, Prascovia's father tried to dissuade her from starting. How could she, a penniless, unknown girl, gain access to the Tsar, even if she braved the dangers of the journey? But Prascovia put her trust in God, knelt to receive her parents' blessing, kissed them, and, with just one ruble in her pocket started on her long walk through the forest. Her parents went with her a little way to the town near, where she had friends who gave her a bed the first night; but next day her lonely tramp began. On and on, through the miles of forests, over rough roads and across rivers, Prascovia plodded, sometimes losing her way, sometimes getting soaked with rain, often weak with hunger and spent with exhaustion. At times she met with kindness, was made welcome at a cottage, or got a lift in a cart; at other times she was roughly ordered away or hooted by village boys.

THE SORROWS OF THE LONG WALK TO PETROGRAD

In one cottage where she spent a night the people seemed so unfriendly and suspicious that Prascovia was afraid they meant her ill, especially when, thinking her asleep, they searched her clothing. But they were merely curious.

As winter came on and snow fell, Prascovia's misery increased, and she was often hindered by the snow-drifts. When in a barge on the Volga, she was pushed into the water by accident, and as a result fell ill; but some good nuns nursed her till she was well again.

At last Prascovia, much to her joy, reached Petrograd. A kind lady interested herself in the girl, and took care of her, until an opportunity came to present her petition to the mother of the Tsar. This lady was touched with the story Prascovia told her, and promised to take her to the Tsar.

Now the way was clear, and two days later Prascovia was in the presence of the Tsar. To her relief, he received her kindly, promised inquiry into her father's trial, and gave her five thousand rubles. The grateful girl poured forth her thanks and blessings on the Tsar.

THE PARDON FOR WHICH A BRAVE GIRL PAID WITH HER HEALTH

And so Prascovia got the pardon for her father, and when the Tsar asked if there was anything she wanted for herself, she begged for a like act of mercy for two friends of her father who were also in exile.

Prascovia soon set out to meet her parents on their way home from Siberia, and joyful indeed was the meeting; but the poor girl never really recovered from the hardships of her long journey, and she was an invalid during the rest of her life.

THE NEXT GOLDEN DEEDS BEGIN ON PAGE 2507.

A MERRY OLD ENGLISH BALLAD

A NUMBER of old English ballads have already appeared in our pages, and the following is a further example of these very old and once extremely popular stories in rhyme. Its proper title is "King John and the Abbot of Canterbury," but the tale which it tells is, of course, to be regarded entirely as fiction, as there are endless stories of a somewhat similar kind, in which three questions have to be answered, the last of the three seeming to be unanswerable. The way in which it is always possible to answer them serves to illustrate the resources of human ingenuity. The spelling of the words in this ballad has been modernized.

THE KING AND THE ABBOT

CONTINUED FROM 2309

AN ancient story I'll tell you anon
Of a notable prince, that was called King John;
And he ruled England with main and with might,
For he did great wrong and maintain'd little right.

And I'll tell you a story so merry,
Concerning the Abbot of Canterbury;
How for his housekeeping and high renown,
They rode post for him to fair London town.

An hundred men, the King did hear say,
The Abbot kept in his house every day,
And fifty gold chains, without any doubt,
In velvet coats waited the Abbot about.

"How now, Father Abbot, I hear it of thee
Thou keepest a far better house than me;
And for thy housekeeping and high renown,
I fear thou work'st treason against my crown."

"My liege," quo' the Abbot, "I would it were known
I never spend nothing, but what is my own,
And I trust your Grace will do me no deer
For spending of my own true-gotten gear."

"Yes, yes, Father Abbot, thy fault it is high,
And now for the same thou needest must die;
For except thou canst answer me questions three,
Thy head shall be smitten from thy body.

"And first," quo' the King, "when I'm in this stead,
With my crown of gold so fair on my head,
Among all my liegemen so noble of birth,
Thou must tell me to one penny what I am worth.

"Secondly tell me, without any doubt,
How soon I may ride the whole world about.
And at the third question thou must not shrink,
But tell me here truly what I do think."

"Oh, these are hard questions for my shallow wit,
Nor I cannot answer your Grace as yet;
But if you will give me but three weeks' space,
I'll do my endeavour to answer your Grace."

"Now three weeks' space to thee I will give,
And that is the longest time thou hast to live;
For if thou dost not answer my questions three,
Thy lands and thy living are forfeit to me."

Away rode the Abbot all sad at that word,
And he rode to Cambridge, and Oxenford;
But never a doctor there was so wise,
That could with his learning an answer devise.

Then home rode the Abbot of comfort so cold,
And he met his shepherd a-going to fold:
"How now, my lord Abbot, you are welcome home;
What news do you bring us from good King John?"

"Sad news, sad news, shepherd, I must give,
That I have but three days more to live;
For if I do not answer him questions three,
My head will be smitten from my body.

"The first is to tell him there in that stead,
With his crown of gold so fair on his head,
Among all his liegemen so noble of birth,
To within one penny of what he is worth.

"The second, to tell him, without any doubt,
How soon he may ride this whole world about;
And at the third question I must not shrink,
But tell him there truly what he does think."

"Now cheer up, Sir Abbot, did you never hear yet
That a fool he may learn a wise man wit?
Lend me horses, and serving men, and your apparel,
And I'll ride to London to answer your quarrel.

"Nay, frown not, if it hath been told unto me,
I am like your Lordship, as ever may be;
And if you will but lend me your gown,
There is none shall know us at fair London town."

"Now horses and serving men thou shalt have,
With sumptuous array most gallant and brave;
With crozier, and mitre, and rochet, and cope,
Fit to appear 'fore our father the Pope."

"Now welcome, Sir Abbot," the King he did say,
"'Tis well thou'rt come back to keep thy day:
For and if thou canst answer my questions three,
Thy life and thy living both saved shall be.

"And first, when thou see'st me here in this stead
With my crown of gold so fair on my head,
Among all my liegemen so noble of birth,
Tell me to one penny what I am worth."

"For thirty pence our Saviour was sold
Among the false Jews, as I have been told:
And twenty-nine is the worth of thee,
For I think thou art one penny worse than He."

The King he laughed, and swore by St. Rittel,
"I did not think I had been worth so little!
Now secondly, tell me, without any doubt,
How soon I may ride this whole world about."

"You must rise with the sun, and ride with the same,
Until the next morning he riseth again;
And then your Grace need not make any doubt,
But in twenty-four hours you'll ride it about."

The King he laughed, and swore by St. Jone,
"I did not think it could be done so soon!
Now, from the third question you must not shrink,
But tell me here truly what I do think."

"Yea, that shall I do, and make your Grace merry:
You think I'm the Abbot of Canterbury;
But I'm his poor shepherd, as plain you may see,
That am come to beg pardon for him and for me."

The King he laughed, and swore by the Mass,
"I'll make thee Lord Abbot this day in his place!"
"Now, nay, my liege, be not in such speed,
For alack, I can neither write nor read."

"Four nobles a week, then, I will give thee,
For this merry jest thou hast shown unto me;
And tell the old Abbot, when thou comest home,
Thou hast brought him a pardon from good King John."

MARY STUART'S FAREWELL

Mary Queen of Scots one of the most romantic figures in English history, has been a favorite subject of the poets, and not only with British writers, but with French ones also, as her love of France, "Land of my girlhood's golden prime," was so great that her name is as familiar in French literature as in that of her own country. This poem, on the unfortunate queen's farewell to the land she loved, is from the French of Pierre Jean de Béranger, the greatest of French song-writers. See also the picture on page 861.

FAREWELL, farewell, thou beauteous clime,
Scene of so many a joy gone by!
Land of my girlhood's golden prime,
Farewell! to leave thee is to die!

Homeless, in thee I found a home,
From which I now afar must flee;
But tho' the alien shores I roam,
Ah, cease not to remember me!
The billows sweep the vessel's side,
The wind is waking o'er the main;
Ah, why will Heaven not turn the tide,
And give me back to thee again?

Farewell, farewell, thou beauteous clime,
Scene of so many a joy gone by!
Land of my girlhood's golden prime,
Farewell! to leave thee is to die!

When, lily-crown'd, thro' all the air
I heard thy people's plaudits ring,
Was it because a queen stood there,
Or Mary in her beauty's spring?
Of what avail to vaunt the sway
Of Caledonia's drear domain?
Her sceptre I'd resign for aye
To be one hour thy sovereign!

Farewell, farewell, thou beauteous clime,
Scene of so many a joy gone by!
Land of my girlhood's golden prime,
Farewell! to leave thee is to die!

'Mid Glory's glow, and Love's delight,
My days have passed in bliss supreme;
But yon bleak wilderness of blight,
Will all too soon dispel the dream!
With coming ill my heart is fraught,
Dread phantoms round my pillow flock;
Last night, awaiting me, methought
There loomed the scaffold and the block!

Farewell, farewell, thou beauteous clime,
Scene of so many a joy gone by!
Land of my girlhood's golden prime,
Farewell! to leave thee is to die!

Ah, France, my France, when doom draws near,
When woe-begirt I end my days,
To thee who now my sobs dost hear,
To thee I'll turn my weeping gaze!
Slowly the shore recedes from sight,
Out o'er the surf my bark is tost,
And in the deepening gloom of night
The last faint glimpse of thee is lost!

Farewell, farewell, thou beauteous clime,
Scene of so many a joy gone by!
Land of my girlhood's golden prime,
Farewell! to leave thee is to die!

THE IRISH HARPER

Thomas Campbell has in these favorite verses given us a pathetic and beautiful picture of the faithful friendship of a dog for his poor but kind master. It is no wonder that poets delight to praise the dog, whose friendship for its master is never affected by the worldly position of the latter.

ON the green banks of Shannon, when Sheelah was nigh,
No blithe Irish lad was so happy as I;
No harp like my own could so cheerily play,
And wherever I went was my poor dog Tray.

When at last I was forced from my Sheelah to part,
She said—while the sorrow was big at her heart:
'Oh! remember your Sheelah, when far, far away,
And be kind, my dear Pat, to our poor dog Tray."

Poor dog! he was faithful, and kind, to be sure
And he constantly loved me, although I was poor;
When the sour-looking folks sent me heartless away
I had always a friend in my poor dog Tray.

When the road was so dark, and the night was so cold,
And Pat and his dog were grown weary and old,
How snugly we slept in my old coat of grey,
And he licked me for kindness—my poor dog Tray

Though my wallet was scant, I remembered his case,
Nor refused my last crust to his pitiful face;
But he died at my feet one cold winter's day,
And I played a lament for my poor dog Tray.

Where now shall I go, poor, forsaken, and blind?
Can I find one to guide me, so faithful and kind?
To my sweet native village, so far, far away,
I can never return with my poor dog Tray.

THE STREAM AND THE OCEAN

Victor Hugo was one of the great poets and novelists of France. Most of his stories have been translated into English but not all his poems. These short verses have not the grand roll and the passion of his great poems, as those would not suit the subject he has here chosen; but they make a charming little poem, which has been specially translated into English for our book by Mr. Harold Begbie.

THE streamlet down from the mountainous glen
Fell drop by drop to the roaring sea;
And the ocean, strewn with the wrecks of men,
Cried: "Whimperer, what dost thou want with me?

"Lo, I am the terror that none may fence,
I drive to the edge of the sky my way;
And can I, who am terrible, strong, immense,
Have need of thy trickles of dew and spray?"

Then the streamlet answered the ocean back:
"O bitter sea, to your furious brink,
Without glory or noise, I give what you lack—
A drop of water that men can drink."

THE IVY GREEN

Charles Dickens we all know as one of the greatest English novelists, but hardly at all as a poet. He was not a poet of any note, however, and wrote very little verse. The poem that follows is at least of interest as it was written by him, whose name is so famous and so deservedly revered.

OH, a dainty plant is the ivy green,
That creepeth o'er ruins old!
Of right choice food are his meals, I ween,
In his cell so lone and cold.
The wall must be crumbled, the stone decayed,
To pleasure his dainty whim;
And the mouldering dust that years have made
Is a merry meal for him.
Creeping where no life is seen,
A rare old plant is the ivy green.

Fast he stealeth on, though he wears no wings,
And a staunch old heart has he.
How closely he twineth, how tight he clings,
To his friend, the huge oak-tree!
And slily he traileth along the ground,
And his leaves he gently waves,
As he joyously hugs and crawleth round
The rich mould of dead men's graves.
Creeping where grim death has been,
A rare old plant is the ivy green.

Whole ages have fled, and their works decayed,
And nations have scattered been;
But the stout old ivy shall never fade
From its hale and hearty green.
The brave old plant in its lonely days
Shall fatten upon the past;
For the stateliest building man can raise
Is the ivy's food at last.
Creeping on, where time has been,
A rare old plant is the ivy green.

A FOREST HYMN

In this poem William Cullen Bryant expressively conveys to us the feeling of awe and reverence which inspired him when he thought of the beauty and majesty of a great wood.

THE groves were God's first temples. Ere man learned
To hew the shaft, and lay the architrave,
And spread the roof above them—ere he framed
The lofty vault, to gather and roll back
The sound of anthems; in the darkling wood,
Amid the cool and silence, he knelt down,
And offered to the Mightiest solemn thanks
And supplication. For his simple heart
Might not resist the sacred influence
Which, from the stilly twilight of the place,
And from the gray old trunks that high in heaven
Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs
That our frail hands have raised? Let me, at least,
Here in the shadow of this aged wood,
Offer one hymn—thrice happy, if it find
Acceptance in His ear.

FARRAGUT

This stirring little poem, by William T. Meredith, is a description of the naval battle fought in Mobile Harbor, in 1864, between the Federal and Confederate forces. Admiral Farragut was in command of the Federal fleet. Both sides bore themselves with great gallantry. As we read the lines, we can see the rising sun, soon to be hidden by the smoke of battle. We can hear the drum beat, the thunder of the guns and the shouts of men. The verses close nobly by declaring that the hero fought, not that he might win fame, but that his country might be united under one flag.

GRAY-HAIRED old Farragut,
Bold heart unbroke,
Daring old Farragut,
Thunderbolt stroke,
Watches the hoary mist
Rise from the bay,
While his flag, glory-kissed,
Waits for young day.

See! 'neath Fort Morgan's wall
Black looms a fleet.
Hark! deck and rampart call,
Rolls the drum-beat.
Lads! buoy your anchor-chains
While the steam hums.
Men! to the battlement,
Farragut comes.

Now! as the hurricane
Hurtles in wrath
Squadrons of clouds amain
Back from its path,
Back to the parapet,
To the guns' lips,
Thunderbolt Farragut
Hurls the black ships

Out through the battle's roar
Clear the lad sings,
"By the mark fathoms four,"
While his lead swings.
Steady the wheelmen five,
"Nor' by East keep her,"
"Steady," but two alive;
How the shot sweep her!

High 'neath the spars that sway
'Bove crimson decks,
Over the flames that play
Round the torn wrecks,
Over the dying lips
Framed for a cheer,
Farragut scans his ships,
Guides the fleet clear.

On by heights battle-ploughed,
While the spars quiver;
Onward still flames the cloud
Where the hulks shiver.
See, yon fort's star is set,
Storm and fire past,
Cheer him, lads—Farragut,
Victor at last.

There dares he for duty,
Duty 'bove fame,
Like summer storms beauty
Fame fickle and vain.
Plighted his true heart's troth
And bold endeavour
To Country, and South and North
One flag ever.

O! while Atlantic's West
Knows mist or gale,
While the Gulf's towering crest
Tops a green vale,
Nations shall name thee yet
Old Heart unbroke,
Daring old Farragut,
Thunderbolt stroke!

THE BLUE AND THE GRAY

These well-known lines, by Francis Miles Finch, were inspired by a visit to the National Cemetery at Arlington, where the soldier dead of the Northern and Southern armies lie side by side. Death and time, they seem to say, heal all discords, and in paying honor to the dead, enmity is forgotten.

BY the flow of the inland river,
Whence the fleets of iron have fled,
Where the blades of the grave-grass quiver,
Asleep are the ranks of the dead:
Under the sod and the dew,
Waiting the judgment-day;
Under the one, the Blue,
Under the other, the Gray.

These in the robings of glory,
Those in the gloom of defeat.
All with the battle-blood gory,
In the dusk of eternity meet:
Under the sod and the dew,
Waiting the judgment-day;
Under the laurel, the Blue,
Under the willow, the Gray.

From the silence of sorrowful hours
The desolate mourners go,
Lovingly laden with flowers
Alike for the friend and the foe:
Under the sod and the dew,
Waiting the judgment-day;
Under the roses, the Blue,
Under the lilies, the Gray.

So with an equal splendour,
The morning sun-rays fall,
With a touch impartially tender,
On the blossoms blooming for all:
Under the sod and the dew,
Waiting the judgment-day;
Broidered with gold, the Blue,
Mellowed with gold, the Gray.

So, when the summer calleth,
On forest and field of grain,
With an equal murmur falleth
The cooling drip of the rain:
Under the sod and the dew,
Waiting the judgment-day;
Wet with the rain, the Blue,
Wet with the rain, the Gray.

Sadly, but not with upbraiding,
The generous deed was done,
In the storm of the years that are fading
No braver battle was won:
Under the sod and the dew,
Waiting the judgment-day;
Under the blossoms, the Blue,
Under the garlands, the Gray.

No more shall the war cry sever,
Or the winding rivers be red;
They banish our anger for ever
When they laurel the graves of our dead!
Under the sod and the dew,
Waiting the judgment-day;
Love and tears for the Blue,
Tears and love for the Gray.

A VISION

Henry Vaughan, who had this great vision of Time and Eternity, was a Welsh poet who died in 1695.

I SAW Eternity the other night,
Like a great ring of pure and endless light,
All calm, as it was bright:
And round beneath it, Time, in hours, days, years,
Driven by spheres,
Like a vast shadow moved; in which the World
And all her train were hurled.

HOW MANY TIMES?

Thomas Lovell Beddoes was a writer of the first half of the nineteenth century, which was a time of sentiment in song. The two comparisons worked up into these verses are what critics call "conceits." Wishing to say how much he loves his lady, the poet compares his thoughts of her with all the thoughts of all the people in all the nights and days of a year, or all the drops that glisten in the starlight. These comparisons are built up with a fanciful care, but they lack the simple outburst of feeling of the true song, as given in Burns' popular ditty, "O, my love is like a red, red rose!"

HOW many times do I love thee, dear?
Tell me how many thoughts there be
In the atmosphere
Of a new-fallen year,
Whose white and sable hours appear
The latest flake of Eternity;
So many times do I love thee, dear.

How many times do I love, again?
Tell me how many beads there are
In a silver chain
Of the evening rain,
Unravell'd from the tumbling main,
And threading the eye of a yellow star;
So many times do I love, again.

THE BUTTERFLY'S FUNERAL

This poem—as the first lines suggest—is a sequel to the "Butterfly's Ball and Grasshopper's Feast," given on page 1058. The poem is filled with pretty fancies about small creatures which every boy and girl should know. It tells of a comradeship between the lower animals, and wherever they do not prey on each other there is such a comradeship.

OH ye! who so lately were blithesome and gay,
At the Butterfly's banquet carousing away;
Your feasts and your revels of pleasure are fled,
For the chief of the banquet, the Butterfly's dead!

No longer the Flies and the Emmets advance,
To join with their friends in the Grasshopper's dance,
For see his fine form o'er the favourite bend,
And the Grasshopper mourns for the loss of his friend.

And hark to the funeral dirge of the Bee,
And the Beetle, who follows as solemn as he!
And see, where so mournful the green rushes wave,
The Mole is preparing the Butterfly's grave.

The Dormouse attended, but cold and forlorn,
And the Gnat slowly winded his shrill little horn;
And the Moth, being grieved at the loss of a sister,
Bent over her body and silently kissed her.

The corpse was embalmed at the set of the sun,
And enclosed in a case which the Silkworm had spun;
By the help of the Hornet the coffin was laid
On a bier out of myrtle and jessamine made.

In weepers and scarfs came the Butterflies all,
And six of their number supported the pall;
And the Spider came there in his mourning so black,
But the fire of the Glow-worm soon frightened him back.

The Grub left his nut-shell to join the sad throng,
And slowly led with him the Bookworm along,
Who wept for his neighbour's unfortunate doom,
And wrote these few lines, to be placed on his tomb:

EPITAPH

At this solemn spot, where the green rushes wave,
In sadness we bent o'er the Butterfly's grave:
'Twas here the last tribute to beauty we paid,
As we wept o'er the mound where her ashes are laid.

And here shall the daisy and violet blow,
And the lily discover her bosom of snow;
While under the leaves, in the evenings of spring,
Still mourning his friend, shall the Grasshopper sing.

A MILLION LITTLE DIAMONDS

A MILLION little diamonds
Twinkled on the trees;
And all the little maidens said,
"A jewel, if you please!"

But while they held their hands outstretched
To catch the diamonds gay,
A million little sunbeams came
And stole them all away.

A SUMMER'S DAY

The Scottish writer of these verses, Alexander Hume, lived from 1560 to 1609, and so was a contemporary of Shakespeare. He was the first poet to describe outdoor life with simple feeling. These verses are from the best poem of its kind that had then appeared in the English tongue. "Simples" is an old word for simple remedies; "callor" means cool.

THE time so tranquil is and still,
That nowhere shall ye find,
Save on a high and barren hill,
An air of peeping wind.

All trees and simples, great and small,
That balmy leaf do bear,
Than they were painted on a wall,
No more they move or steir.

The rivers fresh, the callor streams,
O'er rocks do softly rin,
The water clear like crystal seems,
And makes a pleasant din.



WHO KILLED COCK ROBIN?



WHO killed Cock Robin?
I, said the Sparrow,
With my bow and arrow,
I killed Cock Robin.

Who saw him die?
I, said the Magpie,
With my little eye,
I saw him die.

Who caught his blood?
I, said the Fish,
With my little dish,
I caught his blood.

Who made his shroud?
I, said the Eagle,
With my thread and needle,
I made his shroud.

Who'll dig his grave?
The Owl, with aid
Of mattock and spade,
Will dig Robin's grave.

Who'll be the parson?
I, said the Rook,
With my little book,
I'll be the parson.

Who'll be the clerk?
I, said the Lark,
If not in the dark,
I'll be the clerk.

Who'll carry him to the grave?
I, said the Kite,
If not in the night,
I'll carry him to the grave.

Who'll be chief mourner?
I, said the Swan,
I'm sorry he's gone,
I'll be chief mourner.

Who'll bear his pall?
We, said the Wren,
Both the cock and the hen,
We'll bear the pall.

Who'll toll the bell?
I, said the Bull,
Because I can pull,
And I'll toll the bell.

Who'll lead the way?
I, said the Martin,
When ready for starting,
And I'll lead the way.

All the birds in the air
Began sighing and sobbing
When they heard the bell toll
For poor Cock Robin.

To all it concerns,
This notice apprises,
The Sparrow's for trial
At next bird assizes.

LITTLE VERSES FOR VERY LITTLE PEOPLE

"JACKY, come give me thy fiddle
If ever thou mean to thrive."
"Nay; I'll not give my fiddle
To any man alive.

"If I should give my fiddle,
They'll think that I'm gone mad,
For many a joyful day
My fiddle and I have had."

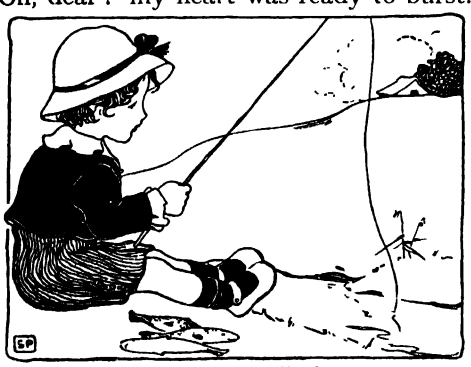
IF wishes were horses,
Beggars would ride;
If turnips were watches,
I would wear one by my side.

ROBIN THE BOBBIN, the big, greedy Ben,
He ate more meat than fourscore men;
He ate a cow, he ate a calf,
He ate a butcher and a half;
He ate a church, he ate a steeple,
He ate the priest and all the people!
A cow and a calf,
An ox and a half,
A church and a steeple,
And all the good people,
And yet he complained he was hungry.

I LOVE SIXPENCE



AS I was going by Charing Cross,
I saw a black man upon a black horse;
They told me it was King Charles the First;
Oh, dear! my heart was ready to burst.



LITTLE Tommy Tittlemouse
Lived in a little house;
He caught fishes
In other men's ditches.

IF you sneeze on Monday, you sneeze for danger;
Sneeze on a Tuesday, kiss a stranger;
Sneeze on Wednesday, sneeze for a letter;
Sneeze on a Thursday, something better;
Sneeze on a Friday, sneeze for sorrow;
Sneeze on a Saturday, see your sweetheart to-morrow.

COLD and raw the north wind doth blow,
Bleak in a morning early;
All the hills are covered with snow,
And winter's now come fairly.

DOCTOR FOSTER went to Glo'ster,
In a shower of rain;
He stepped in a puddle, up to his middle,
And never went there again.

TOM, TOM, THE PIPER'S SON



TOM he was the piper's son,
He learn'd to play when he was young,
But the only tune that he could play
Was, "Over the hills and far away."



Now Tom with his pipe made such a noise,
That he pleased both the girls and the boys,
And they stopp'd to hear him play,
"Over the hills and far away."

Tom with his pipe did play with such skill,
That those who heard him could never keep still;
Whenever they heard they began for to dance,
Even pigs on their hind legs would after him prance.



As Dolly was milking her cow one day,
Tom took out his pipe and began for to play;
So Dolly and the cow danced "The Cheshire round,"
Till the pail was broke and the milk ran on the ground.

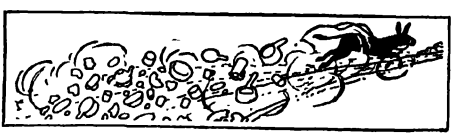


He met old Dame Trot with a basket of eggs.
He used his pipe and she used her legs;
She danced about till the eggs were all broke,
She began for to fret, but he laughed at the joke.



He saw a cross fellow was beating an ass,
Heavy laden with pots, pans, dishes, and glass;
He took out his pipe and played them a tune,
And the jackass's load was lightened full soon.







SOLOMON GRUNDY,
Born on a Monday,
Christened on Tuesday,
Married on Wednesday,
Took ill on Thursday,
Worse on Friday,
Died on Saturday,
Buried on Sunday,
This is the end of
Solomon Grundy.

PUSSY CAT, pussy cat, where have you been?
I've been to London to look at the Queen.
Pussy cat, pussy cat, what did you there?
I frightened a little mouse under the chair.



I HAD a little pony,
His name was Dapple Gray,
I sent him to a lady,
To ride a mile away.

She whipped him, she slashed him,
She rode him through the mire;
I would not lend my pony now
For the lady's hire.

POOR old Robinson Crusoe!
Poor old Robinson Crusoe!
They made him a coat
Of an old nanny goat,
I wonder how they could do so!
With a ring a ting tang,
And a ring a ting tang,
Poor old Robinson Crusoe!

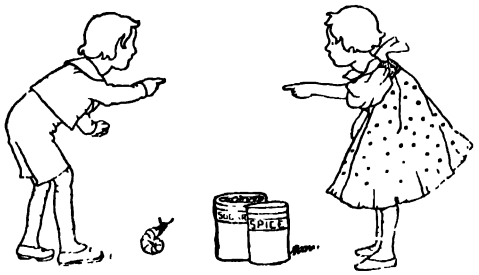


THREE wise men of Gotham
Went to sea in a bowl:
And if the bowl had been stronger
My song would have been longer.

I'LL tell you a story,
About Jack a Nory—
And now my story's begun:
I'll tell you another
About Jack and his brother—
And now my story's done.

PUSSY-CAT MOLE
Jumped over a coal,
And in her best petticoat burnt a great hole.
Poor Pussy's weeping—she'll have no more milk
Until her best petticoat's mended with silk.

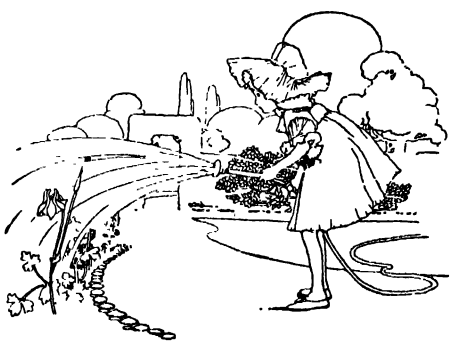
WHAT are little boys made of, made of,
What are little boys made of?
Snaps and snails, and puppy-dogs' tails;
And that's what little boys are made of,
made of.



What are little girls made of, made of,
What are little girls made of?
Sugar and spice, and all that's nice;
And that's what little girls are made of,
made of.

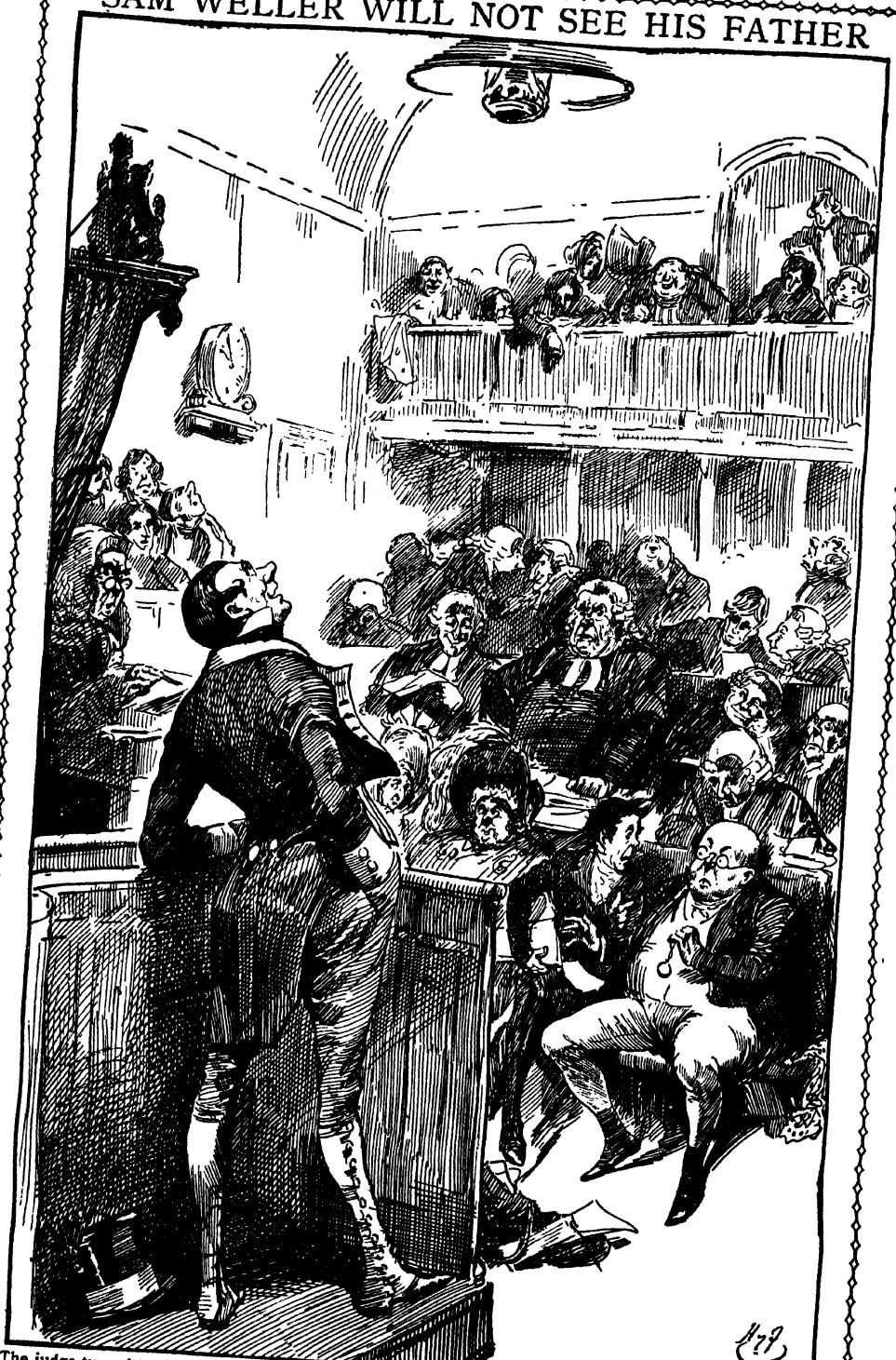
THERE was an old woman, and what do you think?
She lived upon nothing but victuals and drink:
Victuals and drink were the chief of her diet;
This tiresome old woman could never be quiet.

She went to the baker to buy her some bread,
And when she came home her old husband was dead;
She went to the clerk to toll the bell,
And when she came back her old husband was well.



MARY, Mary, quite contrary,
How does your garden grow?
With cockle-shells and silver bells
And columbines all of a row.

SAM WELLER WILL NOT SEE HIS FATHER



The judge turned to the witness as soon as his indignation would allow him to speak. "Do you see your father here now?" he asked. "No, I don't, my lord," replied Sam, staring up into the lantern in the roof.

A GLANCE THROUGH THE DICKENS NOVELS

AS we did in the case of Sir Walter Scott's Waverley Novels, we are now to do with the novels of Charles Dickens. We are to make a hasty run through all these famous books before taking up those about which we are to read at greater length. It is true we have already read three of his famous Christmas books, but these are quite exceptional, and may be regarded as outside the general novels of Dickens. In the case of the Waverley Novels we first looked through the whole series in the historical order of the times they described. But with Dickens we cannot do this, as his great novels nearly all describe the life of his own time, and so we shall take them here in the order in which they were written.

THE STORIES OF DICKENS

CONTINUED FROM 2304

WE began our readings in Charles Dickens with his famous Christmas books. He wrote a great many short stories in addition to his long novels, but we have so many of the long stories to read that we must pass over these shorter tales even without so much as mentioning their names. Nor shall we read his first book of all here. That is entitled "Sketches by Boz," and is a collection of lightly-written articles, meant at first to amuse and entertain newspaper readers, but so full of humor, kindly feeling, sympathy and real character, that they deserved the happier fate which made them into the first published book of one of the greatest English authors. "Boz" was the name under which Dickens wrote these early sketches.

Nor can we very well tell the whole story of "The Pickwick Papers" here. That was the work which made the name of Dickens famous and first brought him in the way of fortune. It is a long, rambling story, loosely but delightfully told, and any short summary of it would be of no value. Samuel Pickwick is the chief character by name—there are ninety-eight characters in the book—though it was not he who made the story so popular. He is the chairman and founder of a club named after him, which is supposed to exist "for the purpose of investigating the source of the Hampstead Ponds," but is really just a comic excuse for Pickwick and his cronies to go about together and have the most amusing adventures you could imagine a jolly, good-hearted old gentleman getting into. When "The Pickwick Papers" began appearing in monthly parts, the first few issues were not very successful, but as soon as Samuel Weller was introduced, readers everywhere were delighted, and that comical serving man to Mr. Pickwick became at once the most popular character in the stories of that time, as, indeed, he is to this day. We simply can't help liking Sam Weller, though both he and his father Tony are far from being model citizens. Before Sam came into the service of Mr. Pickwick, he was employed at the White Hart Inn in the High Street, Borough, on the south side of London Bridge; and we first see him busy cleaning boots, when a chambermaid calls to him.

"Number twenty-two wants his boots."

"Ask number twenty-two whether he'll have 'em now or wait till he gets 'em," was the reply.

"Come, don't be a fool, Sam!" said the girl coaxingly. "The gentleman wants his boots directly."

"Well, you are a nice young 'ooman for a musical party, you are," said the boot-cleaner. "Look at these here boots—eleven pair o' boots; and one shoe as b'longs to number six, with the wooden leg. The eleven boots is to be called at half-past eight, and the shoe at nine. Who's number twenty-two that's to put all the others out? No, no; reg'lar rotation, as Jack Ketch said wen he tied the men up. Sorry to keep

you a-waitin', sir, but I'll attend to you directly."

We can tell at once from this that Sam is going to give us much amusement, and he does. Indeed, Sam never speaks without raising a smile, and more often a hearty laugh. His stories are always comical, if they are not always strictly true, as, for instance, his explanation of what the twopenny rope was.

"The twopenny rope, sir," replied Mr. Weller, "is just a cheap lodgin'-house, where the beds is twopence a night."

"What do they call a bed a rope for?" said Mr. Pickwick.

SAM WELLER DESCRIBES A STRANGE SORT OF BED TO MR. PICKWICK

"Bless your innocence, sir, that a'nt it!" replied Sam. "When the lady and gen'l'm'n as keeps the hotel first begun business, they used to make the beds on the floor; but this wouldn't do at no price, 'cos instead o' taking a moderate twopenn'orth o' sleep, the lodgers used to lie there haff the day. So now they has two ropes, 'bout six foot apart, and three from the floor, which goes right down the room; and the beds are made of slips of coarse sacking, stretched across 'em."

"Well?" said Mr. Pickwick.

"Well," said Mr. Weller, "the adwantage o' the plan's hobvious. At six o'clock every mornin' they lets go the ropes at one end, and down falls all the lodgers. Consequence is, that being thoroughly waked, they get up wery quietly, and walk away!"

SAM WELLER'S FAMOUS APPEARANCE IN THE WITNESS-BOX

We could fill a whole part of THE BOOK OF KNOWLEDGE with stories of Sam Weller alone. He is really the life and soul of "The Pickwick Papers," and those fault-finding people who will tell you he is only a low, vulgar cockney are not to be considered as sound critics. He is a cockney; he is certainly not a gentleman, and he is by no means refined; but he is unfailingly sharp in his remarks, and often extremely witty; and he is certainly a good and useful servant to Mr. Pickwick. It is quite clear that Dickens loved his Weller, and realized that he had found in him the very best way of expressing the native wit of the lower-class Londoner, who at that time was in the habit of confusing the pronunciation of the letters "v" and "w"; that is to say, Sammy's father called his son "Veller." Sam was a witness in a very funny breach of promise case, brought against Mr. Pickwick, and we shall just take a peep at him in the witness-box.

"Call Samuel Weller."

It was quite unnecessary to call Samuel Weller; for Samuel Weller stepped briskly into the box the instant his name was pronounced; and placing his hat on the floor, and his arms on the rail, took a birdseye view of the bar, and a comprehensive survey of the bench, with a remarkably cheerful and lively aspect.

"What's your name, sir?" inquired the judge.

"Sam Weller, my lord," replied that gentleman.

"Do you spell it with a 'V' or a 'W'?" inquired the judge.

"That depends upon the taste and fancy of the speller, my lord," replied Sam. "I never had occasion to spell it more than once or twice in my life, but I spells it with a 'V.'"

Here a voice in the gallery exclaimed aloud: "Quite right, too, Samivel, quite right. Put it down a we, my lord, put it down a we."

WHY SAM WAS QUITE UNABLE TO SEE HIS FATHER IN COURT

"Who is that who dares to address the Court?" said the little judge, looking up. "Usher."

"Yes, my lord."

"Bring that person here instantly."

"Yes, my lord."

But as the usher didn't find the person, he didn't bring him; and, after a great commotion, all the people, who had got up to look for the culprit, sat down again. The little judge turned to the witness as soon as his indignation would allow him to speak, and said:

"Do you know who that was, sir?"

"I raythor suspect it was my father, my lord," replied Sam.

"Do you see him here now?" said the judge.

"No, I don't, my lord," replied Sam, staring right up into the lantern in the roof of the court.

"If you could have pointed him out, I would have committed him instantly," said the judge.

Sam bowed his acknowledgments and turned, with unimpaired cheerfulness of

countenance, towards Serjeant Buzfuz. Above all, Sam Weller is notable for what have been called "Wellerisms" ever since he first appeared in print. We can only explain a Wellerism by giving one example. Being asked to sing, he replied: "Raly, gentlemen, I'm not wery much in the habit o' singin' without the instrument; but anythin' for a quiet life, as the man said wen he took the sitivation at the lighthouse."

That is a Wellerism, and if it is a somewhat mechanical sort of wit that always uses the same device, "as the man said," and so forth, it is undoubtedly amusing as we find it in the sayings of Mr. Pickwick's famous servant. Into the endless mishaps that attended the career of Mr. Pickwick in his outings with his friends we cannot enter here. But, you may be sure, it is usually Sam Weller that comes to his rescue, as he did once when Mr. Pickwick had fallen asleep in a barrow.

SOME OF THE MANY QUAINT AND CURIOUS FOLK WE MEET IN "PICKWICK"

It was after a picnic lunch, Mr. Pickwick's friends had left the old gentleman alone, and an irate landlord, on whose grounds they had trespassed, caused the barrow and its contents to be wheeled to the village pound, where the beadle kept Mr. Pickwick prisoner, and the urchins tormented him until the faithful Sam appeared, and "damaged" the said beadle in relieving his master. Of the Fat Boy, of Bob Sawyer, the rowdy medical student, of the Rev. Mr. Stiggins, of Serjeant Buzfuz, the browbeating barrister, of Dodson and Fog, the quaint lawyers, of Jingle, the actor, of Snodgrass, Tupman, and Winkle, his fellow-members of the Pickwick Club, of Mr. Wardle, the old country gentleman who entertained Mr. Pickwick and his friends at his house, of Mrs. Bardell, and ever so many other odd and interesting characters, we could say much; but as it is impossible to give anything like a description of the whole story, we can only pass from it by saying that it is a real old-fashioned English book, dealing, where it is true to life, with manners and customs that have now passed away; full of comic exaggeration, and a source of hearty laughter. It will, indeed, be not altogether to our credit if we cannot be amused by the adventures of Mr. Pickwick.

"The Pickwick Papers" began appearing in 1836, and the author started his next great book, "Oliver Twist," while the other was still unfinished, doing a part of the one and a part of the other time about. Nor had he completed "Oliver Twist" ere he was at work on "Nicholas Nickleby." Of these two books we shall read later on.

TWO LONG STORIES THAT GREW OUT OF A SHORTER ONE

Then, in 1840, he began as a long serial "Master Humphrey's Clock," which was to contain a number of different stories, but after a time developed into "The Old Curiosity Shop" and "Barnaby Rudge." That is to say, "Master Humphrey" was, in a way, the parent of these two far longer and much finer stories, about which we shall read further.

"Martin Chuzzlewit," begun in 1843, we must also read together, and we have already read "A Christmas Carol" and "The Chimes," which came next from his magic pen. "Dombey and Son," published in 1849, and "David Copperfield," begun in monthly parts in the same year, we have yet to read.

In 1852 "Bleak House" began as a serial story. It was a story of that day, and most of the life described in it, even the very places, have now passed away. With what is the main object of that story we need not greatly concern ourselves. In fact, it is neither easy to explain nor to understand. The old Court of Chancery existed to dispose of the fortunes of people who died and left their wealth to relatives not yet twenty-one, and to put right doubtful wills and bequests.

A WARM-HEARTED BOOK THAT HAS A VERY COLD NAME

What happened very often was that the wily lawyers of Chancery swallowed up all the money and took years to settle the cases, with the result that, at the end, the people who had been left the fortunes had grown old and never had the privilege of receiving them. It was an evil system, but is now greatly improved, and perhaps the way Dickens attacked it in this book helped to have it improved.

Although the story has a cold name, "Bleak House" is really one of its author's fine, warm-hearted books, full of quaint and interesting people. It

begins by telling us of the case of Jarndyce and Jarndyce, which had been before the Court of Chancery for so many years that most of the money at stake in the first instance was now in the pockets of the lawyers.

ESTHER SUMMERSON, THE HEROINE WHO TELLS THE TALE OF "BLEAK HOUSE"

It is a woman who is supposed to write the story—Esther Summerson—though sometimes her part stops and the author takes the story in hand himself. Esther tells us that when the woman with whom she lived died rather suddenly, almost her last words spoke of Jarndyce and Jarndyce; so that she began to wonder what this strange case had to do with her. For Esther didn't know her parents and was quite alone in the world. By a mysterious friend she was sent to a school and well cared for, her own gentle and loving nature being, perhaps, the real reason of that; and when she was a young woman the same unknown friend arranged for her to become companion to a young lady, Ada Clare, who was concerned in the Jarndyce case. Ada's cousin, Richard Carstone, was also concerned in the case, and all three met in London on their way to Bleak House in the country. When they all met for the first time, none of them had ever seen their mysterious friend, except for Richard having once had a glimpse of him, he thought.

Their friend turned out to be Mr. John Jarndyce, the master of Bleak House, one of the kindest-hearted old bachelors that ever lived. Esther was at once made mistress of Bleak House, to her intense surprize, and she had to watch over Ada and Richard, for Mr. Jarndyce put the greatest trust in her.

THE GOOD MR. JOHN JARNDYCE AND THE SELFISH HAROLD SKIMPOLE

Bleak House was a really fine mansion, and only one of its inmates had a selfish heart. That was Harold Skimpole, a charming old gentleman, whom Mr. Jarndyce had befriended, and who seemed the very picture of every goodness, but was at heart a selfish, lazy old fellow; a sponger, in short. Their life at Bleak House was happy and full of interest at first; Richard was clearly falling in love with Ada, and Esther loved Ada sincerely. But many troubles were in store for all. Richard was not always wise in what he did; the Jarndyce case dragged on and kept all in terrible suspense, for it involved the fortunes of both Richard and Ada.

We cannot follow the story, however, except to say that in the end, when poor Richard had married Ada and the case was at last concluded, their fortunes had vanished, and, Richard being stricken with consumption, the turf had been laid upon his grave ere his little son was born. Esther also discovered the secret of her parentage, but best of all was her marriage with Dr. Allan Woodcourt, the great-hearted surgeon who strove so nobly to save Richard's life. Their new home they also named Bleak House, and though John Jarndyce lived on at the old house of that name and watched over Ada, the two Bleak Houses were in constant communication.

THE LESSON DICKENS TEACHES IN THE STORY CALLED "HARD TIMES"

"Hard Times," which began to appear in 1854, was the next novel by Dickens. It is also a "story with a purpose." Although John Ruskin, the famous art critic, thought it in some respects the greatest work of Dickens, that is not the general opinion.

There is a Thomas Gradgrind, who is a great believer in statistics; he thinks that you can tell exactly the happiness and misery of a place by finding out how many births and deaths, and how much wages the people earn, what the rents of the houses are, and all that sort of thing. But he is a good-hearted man, for all his faith in these dry, deluding figures. He persuades his daughter Louisa to marry Josiah Bounderby, banker and cotton master, who is much older than she is, and by no means a lovable person. But her brother Tom is in Bounderby's office, and she wants to please her father and to help Tom.

Of course, such a marriage could not turn out happily, and as Tom steals money and runs away, matters are worse than ever. Mr. Gradgrind lives to understand that it is not wise to trust to mere statistics, and to realize that human hearts and their feelings cannot be reckoned like sums in arithmetic. When Bounderby dies, Louisa is able to marry according to her own choice, and she is happy in the end.

In "Little Dorrit," which Dickens wrote a year after "Hard Times," we have a contrast between poverty and riches. The first part of the story is all about the unpleasant associations of the Debtors' Prison, in which some members of the Dorrit family had to pass some years of their life. With the exception of Amy, who is known as Little Dorrit, and Frederick, her father's brother, who has to play the clarionet for a living, all the Dorrits are a pitiable lot in the days of their debt and poverty, and it is only natural that when they come into money they should prove to be as contemptible in their pride as they were pitiable in their poverty. Little Dorrit, however, is unchanged through all her trials, and is ever sweet and affectionate. She marries a worthy young man named Arthur Clennam, and leaves us with a future of assured happiness in store, none deserving that better than Amy.

THE ROMANCE OF THE FRENCH REVOLUTION CALLED "A TALE OF TWO CITIES"

Next from the busy pen of the great novelist came his fine romance of the French Revolution, called "A Tale of Two Cities." The two cities are London and Paris, and the state of life in them during the awful years of the Revolution is very vividly described. The story is quite unlike all the other novels by the same author. For they all rely for interest upon the characters described in them, rather than upon the thrilling events which take place.

It is the opposite with "A Tale of Two Cities." The real hero of the story is Sydney Carton, a true gentleman at heart, who has, unfortunately, taken to foolish ways of life, and ruined all his chances of worldly success. Dr. Manette, a French gentleman, who has been imprisoned in the Bastille of Paris for eighteen years, is at length liberated and restored to his daughter Lucie, who marries one called Charles Darnay, son of the Marquis St. Evrémonde, and a refugee in London.

For Lucie, Sydney Carton has a strong and self-sacrificing love, and her marriage, of course, makes everything hopeless to him. But Darnay, at great risk, goes to Paris to try to help a friend in distress; Lucie and Dr. Manette go there also, and Sydney Carton as well. In the awful days of the Terror, when many innocent people were beheaded every day without a proper trial, and on the mere word of any informer, Darnay is arrested. But, by managing to take his place in the prison, Sydney Carton saves the life of Lucie's husband, and allows himself to be executed instead.

THE LAST WORDS OF SYDNEY CARTON AND THE STORY OF "PIP"

It is really a great story of self-sacrifice, and the last words of Sydney Carton before he is executed are: "It is a far, far better thing I do than I have ever done; it is a far, far better rest I go to than I have ever known."

In 1860, "Great Expectations" began to come out in monthly instalments. This is one of the novels in which the hero is made to tell his own story, and a most interesting story it is. He is known as Pip, the nephew of a village blacksmith, who brings him up. He is a poor lad, who dreams of one day being a "gentleman," a dream that seems most unlikely ever to come true. When he is about seven he meets an escaped convict in the village churchyard, and is frightened by the man, whose name is Magwitch, into bringing him a file to remove his fetters and some food to eat. The convict escapes to New South Wales.

Pip, meanwhile, becomes the playmate of little Estella, the adopted child of Miss Havisham, who is the daughter of a rich brewer. Miss Havisham has been disappointed in love, and has a hatred of men, so that she is teaching the beautiful Estella to break men's hearts when she grows into a fascinating woman, and Pip is to be her first victim.

HOW PIP'S "GREAT EXPECTATIONS" WERE NOT ALL REALIZED

Later on, Pip is bound apprentice to his uncle; but when he has served only half his time, he is told that some mysterious benefactor has provided for his education, and that he may now regard himself as a young gentleman with "great expectations." It looks as if the dream were to come true, after all. His friend was none other than Magwitch, now a rich farmer, and when Pip was twenty-three the ex-convict came back secretly to England to see him and give him a fortune. But Magwitch was recognized and arrested, being condemned to death at Newgate, and his whole fortune confiscated, so that Pip was penniless after all, and had to become a clerk. Still, he had another "great

expectation": to marry Estella, his former playmate, who was really the child of Magwitch, and who was to inherit Miss Havisham's riches. However, she married a man who used her very badly, squandered her fortune, and left her in most unhappy circumstances when he died. Pip was now a partner in his firm, and he still loved Estella, so that perhaps he married her after all; but the story ends without telling us, and leaves that to be guessed, though there is little doubt of it, as Estella had always really loved Pip, and only her old pride led her away from him at first. Neither had any false pride left, so that they could look to a happy future.

"OUR MUTUAL FRIEND" THE LAST GREAT NOVEL OF CHARLES DICKENS

The last great novel which Dickens finished before his death was "Our Mutual Friend," one of his heartiest and most delightful stories. John Harmon is the "mutual friend," meaning that he is the friend of the Boffins as well as the Wilfers, but the word "mutual" is wrongly used, as "common friend" would be correct in such a case. The son of a hard-hearted old contractor, who turns him out of doors for protesting against the way his sister had been treated, John goes abroad by the help of Boffin, who worked for old Harmon, and is supposed after a good many years to be dead. But he returns to England to find that his father has died, leaving his fortune of $500,000 to him, on condition that he marries Bella Wilfer, and, if he does not, that the money shall go to the Boffins. John greatly dislikes the idea of having to marry one he has never seen, and decides to conceal his real name for a time, calling himself John Rokesmith, under which name he takes service with Mr. Boffin, who recognizes him, but does not let John know his secret is guessed.

MR. BOFFIN'S CLEVER LITTLE PLOT TO TEST THE LOVE OF JOHN AND BELLA

Boffin, however, contrives a meeting between Bella and John, and John falls in love with her sure enough. Then, in order to test Bella's love, Boffin pretends to be angry with John for aspiring to marry her, and becomes unfriendly to him, so that if she does marry him she will think she is marrying a poor man, and losing the fortune provided by old Harmon's will should John Harmon turn up and be willing to marry her. But Bella loves John for his own sake, and does not hesitate to marry him and to live with him on his small earnings. After their first child is born, however, good Mr. Boffin puts all right, and John has the joy of taking his wife to a beautiful house where, now possessing his own fortune, John Harmon and his wife live in happiness and luxury with their dear old friends, Mr. and Mrs. Boffin.

Of course, this is a very bare outline of the story, and we must all read the book for ourselves. It contains a number of characters who are as well known as though they had really lived—better known, in fact, as they live for ever in the pages of Dickens and in the memory of his readers. All his books are rich in this way, and there are few of them that do not give us a picture of a man or woman we shall never forget. In "Our Mutual Friend," for instance, apart from the principal persons already named, there are Mr. and Mrs. Podsnap, both pompous, self-satisfied persons, who think they are in "society" and very superior to ordinary people. Hence we call persons of that class "Podsnaps."

SILAS WEGG, WITH THE WOODEN LEG, AND JENNY WREN, THE DOLL'S DRESSMAKER

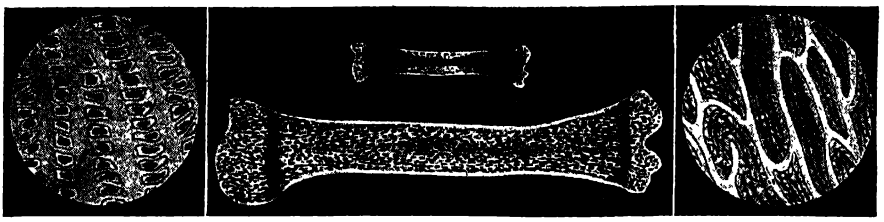
Then there is Silas Wegg, with the wooden leg, who kept a fruit-stall and wrote poetry like this:

> Beside that cottage door, Mr. Boffin,
> A girl was on her knees;
> She held aloft a snowy scarf, sir,
> Which (my eldest brother noticed)
> fluttered in the breeze.

But young folk will be most interested, perhaps, in Jenny Wren, the dolls' dressmaker, who is certainly one of the best characters in the whole story.

Of "Edwin Drood," the last work on which Charles Dickens was engaged at the time of his death, in 1870, it need only be said that this is an unfinished story of mystery, and though many efforts have been made to complete it by other writers, none seem to have been quite successful, and the book remains, like one of those broken columns we see in graveyards, to remind us that death overtook the great author, whose magic pen had given so much entertainment to his own and later generations, while he was still at the height of his power and inventive genius.

THE NEXT STORIES OF FAMOUS BOOKS ARE ON 2563.



A growing bone differs from a grown-up bone. On the right are shown the canals and red blood-cells of a grown-up bone. On the left are the growth-cells of a growing bone. The dark part on the small middle picture shows the growth-power of a child's bone, which disappears as the bone grows larger.

HOW YOUR BODY IS BUILT UP

CONTINUED FROM 2368



WHEN the bodies of animals began to develop into more beautiful and complicated forms, when they became larger and able to do a greater variety of things, it was necessary that the body should produce in itself some hard parts which would serve like a scaffolding to hold the body together and for the muscles to pull upon. When we see great buildings made nowadays, by first of all putting up skeletons of iron or steel, as shown on page 611, we can get an idea of one of the many uses of these hard parts of the body. Perhaps the very first use that hardness was put to in the body was protection, as we see to-day in the shell of the snail and the oyster; and we shall soon learn that some of our own bones exist mainly for this purpose.

We may call the hard part of an animal its *skeleton*, and if we compare such an animal as a lobster with such a fish as a herring we shall learn the first interesting thing about skeletons. It is that an animal may have its skeleton outside its body or inside its body. The lobster's skeleton is outside its body, and its muscles are inside its skeleton. In the case of the herring it is the other way round. The older kind of skeleton is the lobster's kind, and when we study all the forms of animal life we learn how to trace the beginnings of the newer kind of skeleton which has the rest of the body outside it, and which we see in the fish or in ourselves. The animals that have their skeleton inside their bodies belong to the division called *vertebrates*, from the name, *vertebræ*, of the little bones that are piled against one another to form the backbone. So, instead of vertebrates, we may say backboned animals, and that comes to the same thing.

The animals that have no backbone at all are called *invertebrates*, a large word that means simply "not backboned," and many of these are quite familiar to us and have already been described in this book. For instance, oysters, jelly-fish, snails, moths, butterflies, and sponges, are examples of invertebrate creatures.

By far the most important and wonderful animals in the world are the backboned animals, and we also belong to this great class. We find that we can arrange the backboned animals into a few great groups, and the real way to understand our own skeleton and bones is to study the development of the skeleton from the simple backboned animals upwards.

The lowest kinds of backboned animals are the fishes, and although the first fishes were very humble and simple compared with even a herring, a herring will do quite well for our present purpose. When we open a herring at breakfast, we see that its head is placed at the end of a great column of small bones. This column is its backbone, and the small bones

are its vertebræ. It would be easy to spend many pages in discussing how the skull comes to be formed at the end of the backbone, but we have no room here for that great question. At any rate, the skull contains the brain, and the brain runs down from the head through the backbone, or spine, in the form of a long cord of nervous matter, which is called the spinal cord. The great business of the bones of the head is to protect the brain.

THE WONDERFUL DEVELOPMENT OF THE FISH'S FIN IN HIGHER FORMS OF LIFE

That is true in the case of the herring, and it is true in the case of ourselves. We could scarcely get through a week if we had not the skull to protect the brain. And so now we can learn at once that, even in the vertebrate animals, the most important part of the body is still inside the skeleton and not outside it.

But if we consider the herring further, we find something lacking in him which we know very well in the case of the frog or the horse or ourselves, and that is limbs. We must go to the next group of vertebrates, called the *amphibia*, to find these. Any frog will soon teach us what limbs are. The history of them is that they were developed from long side fins which the fishes invented. Now, when we look at the skeleton of a frog, we see at once that it consists of two parts. One is the part which lies along the length, or the *axis*, of the frog, and this is usually called the *axial* skeleton. It is different in some ways from what we saw in the herring, but it is really the same thing as the herring's skeleton, although, in addition, the frog has four sets of bones projecting sideways and outwards from the axis of its body, which are its four limbs.

THE MARVELOUS UNITY IN ALL KINDS OF CREATURES FROM A FROG TO A MAN

There is no exception to the rule that of all the thousands of kinds of vertebrate animals above the fishes, from the frog up to man himself, every one, without exception, has four limbs, never more and never less, at some stage in its history. This is true of the whale and the seal, and it is even true of the snake, though in these and some other animals one or both pairs of limbs may have become so small that they do not show when the animal is grown up. It is one of the most interesting things in the world to find this wonderful unity of plan, showing itself without exception onwards from the remote time when the side fins of the fish first yielded to the four limbs of such a creature as the frog. No matter whether the creature is a crawling snake or a bright lizard running quickly in the sun, or a whale swimming in the water, or a bird flying in the air, or a dog or a man, the rule is that its skeleton is formed on the principle of a backbone made up of little pieces, but stretched and hollowed out at the front end to hold the brain; and of two pairs of limbs, one in front and one behind.

Another thing we notice about the skeleton of all these creatures—a thing which greatly adds to their grace and beauty—is that it has two sides which are perfectly like each other. This character about a thing is called *symmetry*, which simply means with-measuring. You can measure one arm against the other, and so on.

A MIRACLE THAT WE ALL DO EVERY DAY OF OUR LIVES

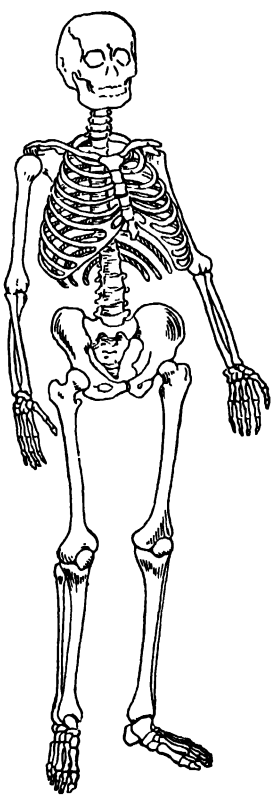
This two-sided symmetry is part of the plan of the body, and it applies not only to the skeleton upon which the body is built, but also to everything. It is not always quite exact, for we find that two sides of the same face are not exactly the same; that the two arms are not exactly the same length. But still, this two-sided symmetry of the body is a thing we can all see, and it is based upon the two-sided symmetry of the skeleton.

Now, we compared the skeleton with the steel framework of, shall we say, some big modern hotel, and it *is* our framework; but it is much more, and before we go on to look at it more closely we should know what all its uses are.

This framework is not the framework of a thing that is to stand still, but of a thing which is to move. A tree has a harder part which is, in a sense, its skeleton; but a tree is a plant, and the rule about plants is that, as they can feed on air and light and earth, they can stay where they grow. But an animal's food is of very special kinds, which are not to be found everywhere, and as its food will not come to it, it must go in search of its food. Therefore, one of the great marks of an animal is that it moves about. Its framework, then,

has to be of a very special kind, for the animal moves not because it is blown or pushed from without, but because it is able to bend certain parts of its body upon other parts of its body. We may never have thought about it, but the mere taking of a single step is a miracle, and the men who have spent twenty years in studying nothing else than that know that the more we study it the more miraculous it is. But all human beings are like that; they go wandering away to find wonderful things, though, wherever they may happen to be, there is infinite wonder under their very noses.

It is plain, then, that it will not do to have a skeleton made all in a piece or made of pieces that are buckled firmly together like the framework of a house or a ship. So, wherever movement is going to be required, we find the skeleton made of separate pieces with joints between them. We have never thought much about joints, perhaps, but engineers have to make joints whenever they build a motor-car or a steam-engine; and they have to keep those joints working smoothly if they can, but no engineer ever made a joint one-thousandth part as wonderful and perfect and durable as any of the scores of joints in our body. Now, the bones have no power of movement in themselves. If they are to move, something must pull them. The things which pull them are the muscles, and the rule about a muscle is that it runs from one bone to another *across a joint*. When the muscle shortens, it bends the one bone on the other at that joint.



The skeleton is the framework of the body, and is made up of more than 200 separate bones.

Plainly, then, the skeleton is very much more than a framework for the body, but we have not discovered all its duties yet. The skull and the backbone are not merely supporting, but protective. Within them there lies the precious nervous substance which guides and directs the whole of the body. Lastly, as if they had not enough to do, very many of the bones contain, inside them, the millions of cells which are ceaselessly engaged in turning out new red cells for the blood. Sometimes the red cells of the blood are destroyed too quickly, and have to be made more quickly than they ought to be. Then we find that the various bones, such as, say, the shinbone, which we may have thought of as if it were a mere supporting rod for the leg, get filled more and more with the living cells which make red cells for the blood—so much so, that if the need for an extra supply of red cells continues, the bony part of the bone will almost disappear, and it may become easy to break. It is well for us to know this, because we are so likely to think of our skeleton as if it were something lifeless inside us, and nothing could be further from the truth.

If we go back to the fishes again for a moment, we shall learn that the bones begin in the shape of something which is not really bony, but gristly. The proper name for gristle is cartilage, and most of our bones are made of cartilage to begin with. Then, by a wonderful process, true hard bone is laid down inside the cartilage in a fashion so wonderful that, compared with it, the building of a breakwater under the sea is easy. The bones of small children are not completely bony; they are more gristly really, and sometimes, in a case where the bone of a grown-up person would have broken, the bone of a child simply bends instead of really cracking, just as the green branch of a tree will bend instead of snapping. So this kind of fracture is called a "green-stick fracture." If we think for a moment, we shall see that no little boy or girl could grow up if his or her bones were like those of grown-up people,

only smaller. If a little boy's bones were finished things, there would be no possible way of enlarging them to perhaps three times the length that they were, and two or three times the thickness. Thus, a growing bone is vastly different from a grown-up bone. The inside of a grown-up bone is busy making red blood-cells, but the outside and the ends of it are doing nothing. The bone is made, and there it is. On the other hand, the outside and the ends of a child's bone are as busy and active as any other part of his body, for they are building.

THE TINY SPECKS THAT WORK FOR US AND BUILD UP OUR BODIES

Perhaps some day you may have a chance of seeing for yourself through the microscope the wonderful way in which the bones are built — some cells laying down new bone; other cells coming along and scooping it out just where it ought to be scooped out, and so on. But I tell you here that the mind of the wisest and soberest man may almost reel at such a sight—when he asks himself how and by what knowledge these tiny specks of living matter do, each of them, their tiny work in the dark for the good of the body, as to the very existence of which it cannot have the smallest notion. Perhaps the people who say that human life is not worth while, and ask what is the good of us all scurrying backwards and forwards, living and dying, and soon being forgotten, may learn from the building of a bone that men and women are engaged in making something just as much beyond their imagining as a man's body and life and thoughts and deeds are beyond the imagining of the tiny cells that built his bones.



Bones of a finger joined by the ligaments, or the things that bind the joints.

It takes years to know the skeleton thoroughly, to understand the use of every little part of every bone; to be able to recognize even a small piece of any bone when we see it; to know whether it is a human bone or the bone of an animal, and to know which side of the body it comes from. Knowledge of that kind is necessary only for the doctor. Here, however, we can learn some of the great facts about the skeleton, especially with the help of some pictures. Pictures of bones are, perhaps, not beautiful, but that is because we do not look at them in the right way. The bones are absolutely necessary to our life; they are most exquisitely made for their purpose, and the way in which they are made is a perpetual miracle. So there is beauty enough even in bones if we could see it.

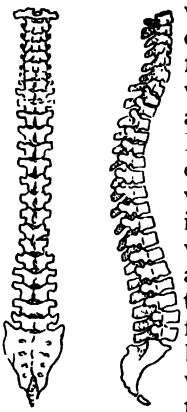
Let us begin with the axial skeleton, which, as we have seen, is the oldest part of the skeleton; and with the oldest part of it, which is the backbone. This is made up, we know, of many small pieces, resting upon one another, and that fact has two interesting meanings. One is that all creatures which have backbones are said to have descended in the remote past from a creature whose body was made up of many pieces very like each other, joined together—such, for instance, as a worm. Even the human body has very many traces in its structure of this descent from a creature whose body was made from pieces called segments. Now, just as the segmented structure of the worm helps its movement, so in almost every one of our movements we benefit by the fact that our backbones are made up of little pieces. If the backbone were really a single bone, our lives would scarcely be possible. Even when we move our arms only, we alter the balance of the body, and it is necessary that the curve of the backbone be slightly altered. One of the uses of exercize, and especially of play and games for children, is that they make the growing backbone supple, and help us to get control of it, so that we are not clumsy when we grow up.

HOW IT IS THAT WE CAN STAND ERECT WITHOUT FALLING

The different vertebræ that make up the backbone differ very much in size and shape. Those in the neck, for instance, are very much smaller than the large ones in the small of the back, which have a great weight to carry; those between the two are different again, because they have attached to them the ribs—the long, curved, slender bones which help to make the wall of the chest. We find that in all sorts of animals, as well as ourselves, the shapes and even the number of the different

vertebræ correspond wonderfully. For instance, there are seven vertebræ in the neck of practically every mammalian animal, as there are in ourselves. The giraffe, with its very long neck, has seven vertebræ, just as you and I have, and just as the whale has, though it seems scarcely to have a neck at all.

There are two great differences between the backbone of man and the backbones of other animals. One is that the backbone of man is very much shorter. In most animals the backbone runs right down into the tail, and there are vertebræ in the tail, as there are anywhere else. But the tail of man is only represented by four tiny vertebræ, which have got squeezed together into a single small bone, and which are of no use, and perhaps are even growing smaller still in mankind.

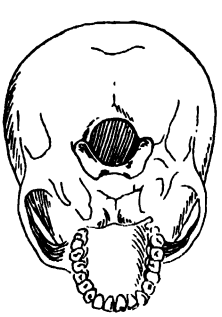


These pictures show the backbone seen from behind and from the side. Below are views of a single bone.



The lower bone shows the hole through which the spinal cord passes down the backbone from the brain in skull shown below.

The other great difference is vastly more important, though you might think nothing could be more important than the almost complete absence of a tail. It is the way in which the backbone of man is curved. There is a great difference between the curve of a baby's backbone and that of a grown-up person. In the baby and in the four-footed animals, and even in the half-erect monkeys, the backbone is so curved that the weight of the body is bound to fall forwards unless a very special, and, after a time, a very tiring, effort is made. A dog can be made to walk on its hind legs, but this is not natural to the dog, and needs a special effort. But the curve of the backbone in ourselves after we have passed the first baby stage is quite different; and, as the body is built upon and round the backbone, the result is that in ourselves, and in ourselves only, the weight of the whole upper part of the body tends to roll not forwards, but backwards. On the front of our hip-joints we have two great straps of strong fibres, called ligaments, which prevent our heads and trunks from rolling backwards when we stand up. Other creatures have these bands of fibres, but in them they are tiny, while in us they are the biggest and largest in the whole body. It is because our backbones are curved as they are, and because we have these bands of fibres in front of our hip-joints, that we can stand erect with scarcely any effort at all. This means that we can use our arms not for mere walking or standing, but for all the many things, like writing and sewing, which help to make us human.



This picture shows the hole at the base of the skull where the backbone fits. Through this hole, down a tube in the backbone, the brain sends messages over the body.

If we look at a single vertebra — not taking any one in particular, but taking an average vertebra, or, as we say in science, a typical vertebra, something corresponding to our general notion of what a vertebra is— then we find that it is a very irregular, and yet a very regular, piece of bone. It has a solid piece called the body, and these bodies are piled upon each other like a pile of coins, and so make the spinal column, or backbone. Opposite the body there is a point projecting, and we can readily see or feel the long row of these points in ourselves or other people, running down the middle of the back. These points, and the others at the side of the vertebra, have muscles and strong cords of fibres attached to them. The vertebræ are so beautifully and perfectly bound together in this way that it is practically impossible for any accident to disjoint or dislocate any part of it unless it is broken as well.

But the other great feature of the vertebra that we notice is the large hole in the middle of it. When the vertebræ are all put together to make the backbone, these holes go together to make a long tube, which opens at the topmost vertebra, and runs right down almost to the end of the backbone. Lastly, if we see a number of the vertebræ put

together, we shall find that even though they are so beautifully and tightly jointed, yet between every two vertebræ on each side there is a hole.

HOW ALL OUR THOUGHTS AND FEELINGS ARE CARRIED THROUGH A TUBE

Now, the tube made by all the vertebræ put together holds the spinal cord, without which we cannot move or feel or live; and the little holes at the sides, between every two vertebræ, carry the great spinal nerves which leave the spinal cord, and then are distributed to every part of the body, even to the skin of the smallest toe—as you will know if you have a corn; and these nerves carry from the spinal cord all the orders to the muscles, and to the spinal cord all the feelings from the skin, and so on.

Now, it is plain to us at once that there must be some great hole in the skull which, so to speak, lets the spinal cord through from the skull into the spinal column; and that is so. When we look at the skull as it is balanced upon the backbone, the most noticeable thing at the base of it is a large hole, and on each side of it there is a very smooth little place. These smooth places fit on to corresponding smooth places on the top vertebra, and every time we move our head the skull rocks on the top vertebra at these two places. The hole between them exactly corresponds to the large hole in the top vertebra—which is, indeed, scarcely more than just a ring of bone—and it is here that the lowest part of the brain is continued into and becomes the spinal cord. It is the brain that feels, and the brain that wills, and every message from our body and limbs to the brain travels along the nerves to the spinal cord, and then through this great hole at the base of the skull up into the brain. Every message from the brain passes out through the spinal cord to the nerves and then to the limbs.

HOW THE SPINAL CORD FLOATS IN THE TUBE AND IS PROTECTED

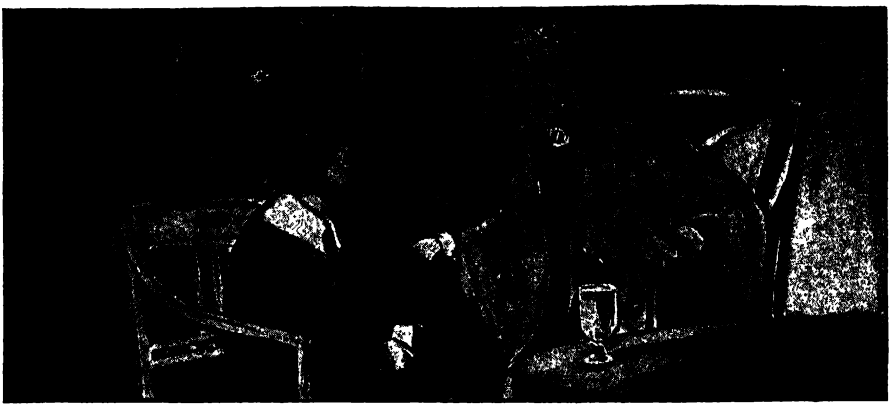
The spinal cord is wonderfully protected by the backbone. Inside the backbone it lies enclosed in a sheath or coat filled with fluid, in which it floats. Thus a blow upon the backbone—unless it is a very hard one—and the movements of the backbone, do no harm to the spinal cord; it does not feel them, for the water-bed in which it floats protects it. Also, the backbone and all the muscles round it, protect the spinal cord very perfectly from the sun. The one place where it is not quite so well protected as anywhere else is the back of the neck, and in people who are not very much accustomed to the hot sun, this is the place where they need to protect themselves from what we call sunstroke. If we allowed our hair to grow long, and if we all had it hanging over the back of the neck as a young girl has, then even this one place would be protected, too. But, as it is, there is very good sense in putting a handkerchief, or something of the kind, over the back of the neck in very hot weather, and so protecting the one place where the central part of the great nervous system is rather more exposed than anywhere else. But remember that even here Nature has provided a protection in the form of the hair, which helps very greatly to protect the brain itself from sunstroke.

THE BACKBONE ROUND WHICH OUR BODIES ARE BUILT

At its lower end the spinal column is jointed to the great hip-bones, from which the bones of the leg spring. At this part of the spinal column we find five vertebræ jointed together into one bone. Long ago it was supposed that the soul lived in this bone, and it is still known as the sacrum, or sacred bone.

Higher up, below the neck vertebræ, and above those that make the small of the back, is the row of twelve vertebræ from which the ribs spring—twelve on each side. The number is the same in men and women; not one less in men, as some people imagine. Most of the ribs in front are joined on to the breast-bone, which you can feel in yourself very easily, and this bony case contains the chest inside it; while outside it are placed the collar-bone and the shoulder-blade, from which spring the bones of the arms. If now we just remind ourselves that the skull is balanced on the top of the backbone, we shall see how much good sense there is in such a saying as that good homes are the *backbone* of any nation. It is round and upon the backbone that everything is built, and without it everything else would go to ruin.

THE NEXT PART OF THIS IS ON PAGE 2569.



WHY IS GRANNY'S HAIR GREY?

CONTINUED FROM 2354.

THE color of the hair depends upon the quantity of coloring matter that it contains. That is to say, hair containing a great deal of coloring matter, or pigment, as it is called, is very dark; hair containing very little is very light. Now, the production of this coloring material depends upon the whole body being in a good state of health, and able to perform all its functions, and it is controlled to a very large extent by the nervous system.

If anything happens to go wrong with this control, either as the result of disease or the wearing out of nerve power in old age, then the pigment gradually ceases to be produced, and the hair becomes grey, and then quite white. When it is white there is no pigment left in it.

Sometimes, we know, sorrow and trouble will turn the hair grey. This is the result of exactly the same process, only in this case the failure to produce coloring matter, or pigment, is caused by anxiety and sorrow or worry instead of by old age or disease; but in both cases it is the power of nutrition that is affected, when the hair turns grey.

WHAT MAKES OUR EYES BLINK?

The real object of the blinking of our eyelids is to keep the front of the eyeballs constantly clean. The blinking itself is done by means of muscles in the eyelids, and the cleaning is done by our tears. In fact, that is really what tears are for. The fluid which we call tears is secreted in a little gland and carried along a canal, or duct, to the eye, and when our eyelids move up and down in blinking, this watery fluid is poured all over the front of the eye, and it washes away any particles of dust or other irritating substance that may be present. Some animals—snakes, for example—have no eyelids, and therefore never blink, and in these creatures there is a hard film, or scale, over the eye to protect it from injury and dirt.

WHY DO WE SOMETIMES FAINT AT VERY SUDDEN NEWS?

Fainting may be due to various causes, one of which is stoppage of the blood supply to certain parts of the brain, and this happens sometimes as the result of a severe or sudden emotion. The result of such a shock to the mind is a sudden contraction of the blood-vessels, which causes the person to become suddenly pale or white, by preventing the blood from reaching the head. When this happens, a person falls

down in a faint. The falling down is Nature's attempt to put things right, because, when one is lying flat on the ground, it is easier for the blood to reach the brain than when one is standing upright. When people faint in this way, they should be allowed to lie flat and the head should be kept low until they recover consciousness.

HOW IS IT THAT WHEN A WORM IS CUT IN TWO IT STILL LIVES?

All animals except the very lowest depend upon what we call a nervous system, which controls the power of movement, and so forth. Now, when this nervous system is all heaped together in the form of the brain, as it is in man and the higher animals, the life of a creature depends upon that brain being uninjured. But in lower creatures, like the worm, the arrangement of the nervous system is different. It is more scattered over the body, and so, when a worm is cut in half, there is enough nerve matter in either half of the worm to enable it to keep living.

COULD WE WALK WITHOUT OUR TOES?

There is no doubt at all that we could walk without toes, but we should not be able to walk nearly so well nor so gracefully, nor so safely, for the simple reason that our toes spread out over the ground to a certain extent, and so give us a greater space upon which to balance our bodies. But, of course, you can easily understand that in these civilized times, when everybody wears boots, the toes themselves are really very little used. In the early days of the human race, however, they were very valuable, and were capable of much more movement than they are now. A person without toes could easily walk, but his steps would be somewhat uncertain, and his movement more restricted.

WHAT IS HYDROPHOBIA?

Hydrophobia (fear of water) is the name given to a disease in man which is the result of the bite of a dog which is ill of a disease called rabies. It gets its name from the fact that the sick person cannot swallow liquids and is thrown into a dreadful state of fear at the sound or sight of water. It is a mistake, however, to say that a dog which has rabies runs away from water. On the contrary it drinks water greedily. Hydrophobia is a very dreadful and fatal disease. A person who has been bitten by a dog should always be treated at once, and the dog should be examined to make sure that it has not rabies, especially if it has hitherto been a gentle animal, or has bitten a child or grown-up person for whom it has always shown affection. It is not true that the bite of a dog which has not rabies will cause hydrophobia. A healthy dog need not be killed because of biting.

WILL FROGS AND FISHES SOME DAY TURN INTO ANIMALS LIKE HORSES?

I suppose you have asked this question because you have learnt that animals were not always as they are now, and so you wonder whether frogs and toads and fishes will in time change to something else. The answer is "No," and the reason is that these animals represent the result of many, many generations of gradual changes until they have been produced in the special form in which we now find them. They are, in fact, like a completely manufactured article, and are therefore as perfect in their way as the horse is in its way. The creatures from which frogs and toads and fishes sprang are not like any of these any more than the raw cotton is like a fully-made shirt.

WHY DO WE EVER STOP GROWING?

What we call growth is the power the cells of the body have of taking nourishment into themselves and so becoming larger, and of dividing and giving rise to other cells like themselves. This power, however, is limited, and every kind of cell can only grow within the limits of its own law—the law of growth. No matter how much food or exercise is taken, the law of growth prevents any number of cells becoming more numerous or larger than a given limit. When the body is young the growth is very active, but as the body grows older the limit of growth is gradually reached, and finally growth ceases altogether.

WHY ARE THERE SOME ILLNESSES THAT WE CANNOT GET TWICE?

This is one of the greatest questions in science to-day, and many very clever men are trying to find out the exact reason why we never suffer twice from certain diseases; in other words, how it is possible for people to become *immune*, or free from these ailments. There is no doubt of the fact that when

people have had small-pox or measles or scarlet fever once, they very seldom suffer from them again, even if there be an epidemic all round them. In some way or other the tissues of the body have become changed as the result of the first attack, and are thus made better able to resist that particular kind of infection. Some people think that our bodies have become accustomed to that infection, so that it does not infect them any more; but, whatever the exact nature of the resisting power is, there is no doubt that it is a very common process in many parts of our nature.

WHY DO WE GET HOARSE WHEN WE HAVE A COLD?

We must understand that the voice is produced in a little box in the throat, called the larynx, in which are two membranes called the vocal chords, stretching across the box, and, by their vibration and contraction, producing the different noises and sounds which make our voice. Now, when we get a cold in the throat these vocal chords swell up and become filled with fluid, and are therefore thick and irregular The result of this is that they are unable to produce a clear note, and so the voice sounds thick or hoarse. It is as if the string of a fiddle were soaked in hot water in places until it had become swollen or thick. It would then be unable to vibrate properly, and we could not produce a clear note with it.

WHY CAN WE HEAR SO MUCH BETTER OVER WATER THAN OVER LAND?

Sound is composed of waves of different lengths transmitted through the air, and these waves can be interrupted and broken up by coming in contact with any obstacle, as the waves of water are broken up when they strike a rock. Now, on the land sound waves cannot travel very far without striking against houses, or trees, or mountains, or other obstacles to their progress, and these prevent the sound traveling to a great distance. On the sea, however, or on a great lake where the surface is perfectly level, it is possible to hear for a very long distance, simply because there is no hindrance to the path taken by the sound.

WHY DO FISH DIE, ALTHOUGH KEPT IN A JAR OF WATER?

We are all apt to imagine that all that is necessary for the life of a fish is that it should be in water, but, as a matter of fact, this is not true. It is not the water which keeps the fish alive, but the oxygen in the water, without which no animal, fish, or man can live long. The only reason why fish can live in water better than other animals is that they have a special arrangement in their gills by means of which they can extract this gas from the water better than other animals can. But when a fish is placed in a jar of water it soon uses up all the oxygen that is in it, and when that is the case life is no longer possible. The fish, in fact, is drowned, just as much as a man would be, because he could not breathe under the water, man being able to extract oxygen only from the atmosphere. This is the reason why, if we keep fish in captivity, we have to change the water often in order to supply fresh oxygen.

WHY DO WE SWING OUR ARMS WHEN WE WALK?

It is rather difficult to say exactly why we swing our arms when walking, but there is no doubt that it is much easier to walk in comfort if the arms are allowed to swing naturally than if they are held stiffly by the sides of the body. Probably, therefore, the swing of the arms assists us in unconsciously keeping accurate balance as we move along, first on one foot and then on the other. Perhaps, too, it may be partly a relic of the time when primitive animals used their arms as well as their legs in walking, as a chimpanzee will do. In any case, the fact that it is so much more comfortable to walk swinging the arms seems to suggest that Nature may have intended the swinging to help us in accurate movement.

ARE WE TALLER IN THE MORNING THAN AT NIGHT?

The difference between our height in the morning and at night must be very slight; but if we assume that we are a little taller in the morning the explanation is to be found in understanding exactly how our backbone is made. The backbone consists of a number of bones, or vertebræ, and between each bone there is a disk made of cartilage. The object of this disk is to lessen the shock that would otherwise be felt on moving. Now, after being in an upright position for many hours, it is possible that the weight of the body squeezes

these disks somewhat and makes them a little flatter, so that the total height is slightly reduced. During the night we must suppose that they resume their natural thickness by elasticity, and so stretch the backbone to its full length. In that way we may be a little taller in the morning than we are at night.

WHY ARE BOYS STRONGER THAN GIRLS?

The explanation of the fact that the male sex is generally physically stronger than the female sex is to be found in the ancient history of mankind. In the early days men were generally hunters and warriors, and life was only possible as the result of a severe struggle. After many generations of this it came about that male animals as well as human beings became physically stronger, as the duties of the home and the care of the young generally devolved upon the females.

WHAT GIVES US "PINS AND NEEDLES"?

The curious sensation known as pins and needles is caused by continued pressure upon one or other of the nerves, and this is often the result of sitting or sleeping in an uncomfortable or cramped position. The actual cause of the peculiar feeling in the ends of the nerves is not exactly understood.

HOW IS IT THAT SOME ANIMALS CAN DO WITHOUT FOOD FOR A VERY LONG TIME?

A very good example of this process is to be seen in our common snakes, which, after feeding heartily during the summer months, retire into their winter quarters, where they take no food at all. The reason that they are able to do this is because during the months of activity, when they were feeding, they were enabled to store up in the body a large quantity of fat, which represents the excess of the food taken, over what was required at the time. Now, this fat can be used by the body itself while the animal is not actually eating. It is gradually absorbed, or used up. So we find that a snake which, at the end of the summer, was round and fat is extremely thin when it comes out of its winter quarters in the early spring. Many animals have this property of storing up food in the shape of fat in a greater or less degree; indeed, if it were not for this they could not live through the periods when there is very little food to be got.

WHY DO OUR FEET NOT WEAR AWAY AS OUR BOOTS AND SHOES DO?

There is a very remarkable difference between living things and dead things. Boots and shoes are composed of dead tissues which have no further power of growth, and therefore cannot replace those parts of them that are worn out by friction. Our feet, however, are made of living tissues, and the effect of friction and use, when applied to living things, is to cause these tissues to increase in size instead of wearing away. Indeed, if living tissues are not exercised they will not grow properly. In a single sentence the answer to this question is: boots and shoes wear out because they are dead; our feet grow because they are alive.

WHERE DOES THE TADPOLE'S TAIL GO TO?

At a certain stage in the life-history of a tadpole some of the cells within the tadpole's body begin to attack and devour the cells that make up the tail. The tail is gradually eaten away and absorbed until finally, by the action of these cells, there is nothing of it left. The material thus disappears, by the process which is known as absorption; it is "used up" by something else.

HAS THE AMŒBA GOT EYES, AND CAN IT SEE?

The amœba is a very minute living organism composed of one single cell of jelly-like material. It has no special structure at all, and it has therefore neither eyes nor any other special organs of sensation; but although it cannot see in the ordinary sense of the word, this is no drawback, because every part of the amœba's body is capable of performing all the functions necessary to its life. All creatures which are able to do this are said to be generalized, in contrast to those higher animals in which special parts are set apart for different uses, such creatures being termed specialized.

WHAT MAKES SOME PEOPLE DUMB?

As a rule the cause of dumbness has nothing to do with the vocal chords at all, which are always present and apparently normal, but for some reason or other in these people who are dumb the vocal chords cannot be used. That is to say, although the brain may produce an idea, and the person may wish to speak, something has happened which prevents

the message being sent from the brain to the vocal chords, and so there is no speech. So that we may say that any disease or injury which destroys that part of the brain called the "speech centre," or any disease or injury to the nerve fibres which pass from the speech centres to the vocal chords, will cause dumbness. Dumbness is sometimes present from birth, owing to some defect in development; at other times it comes on suddenly in after life. Sometimes it is permanent, at other times it only lasts for a short period and the person may recover the power of speech.

WHY DO LOUD NOISES MAKE US DEAF FOR A WHILE?

This is partly because a very loud noise makes such a very strong and powerful impression at the time that no other impression of the nature of a sound can be appreciated until the first one has disappeared. It is just the same with other sensations. We cannot feel more than one very intense sensation at once, and the attention of the mind is given to the most powerful. The deafness following a loud noise, or a box on the ears, is also partly due to the changes in the position of the drum of the ear and the delicate internal parts which take a little while to return to their natural position, because until they do this no other sounds can be properly appreciated.

WHY CAN'T WE REMEMBER WHAT HAPPENED TO US WHEN WE WERE BABIES?

There are many faculties of the mind which we only possess as our brain grows older and gets more exercise, and memory is one of these. We can only remember things by exercising that part of the brain which has to do with memory, and when we are still babies there has not been time for that faculty to develop, although it grows much earlier in some children than in others. Besides this, the things happening to us when we are babies are all of much the same degree of importance to us; we do not yet understand what are the big things in our life, and what are not; and so one thing makes about as much impression upon us as another. Now, memory depends largely upon the impression made at the time of the incident; and it is only when the mind is sufficiently developed to judge of the importance of things that memory becomes a well-marked faculty.

WHY DO WE FORGET SOME THINGS AND REMEMBER OTHERS?

Memory depends very largely on the impression made upon us by various incidents. The things we forget most easily are the things which do not strike us as being of much interest or importance when they occur. They readily escape our attention, and therefore are not impressed upon our memory. On the other hand, those things which appear to ourselves as great events in our lives—though they may not appear important to others—are firmly fixed in our memories, and always remembered, and it is for this reason that many trifling things are never forgotten. They did not appear to us trifling at the time, but made a deep impression.

WHY DOES THE CHAMELEON CHANGE ITS COLOR?

The object of the change of color of the skin of the chameleon is to enable it to become like its surroundings at the time, and so aid it in concealing itself. This capacity the chameleon shares with many other lizards, and they are able to change because they possess within the skin a great number of small cells closely packed together, filled with small granules. This causes a white color by reflecting light. Other cells are full of oil drops and appear yellow; others contain brown or reddish pigment, and the changes in color are brought about by contraction of different parts of the skin, and the movement of the different pigments. Thus, when all the pigment is forced towards the surface the animal looks quite dark. When the pigment is not so near the surface the color is changed to green, and where there is no pigment the skin appears yellow. The mechanism which causes these changes appears to be under the control of the will of the chameleon, but, in addition, the external surroundings, such as heat and cold, also cause some changes in the color.

WHEN A DONKEY EATS A THISTLE, WHY DO NOT THE THORNS HURT HIM?

If you will take the trouble to look carefully into the mouths of different kinds of animals, you will find that the inside of the mouth differs very widely in different species, according to the kind of food the animal lives upon. For instance, in your own mouth you will find that the lining of the mouth is

quite soft and easily injured, whereas in some other animals the membrane which lines the mouth is extremely tough and covered with thick scales, which enable the creature to crush foods which would injure a tender mouth. This is the case to a certain extent in cattle and in all animals which feed upon hard kinds of grass, and the donkey's mouth is another example of the same kind of thing We may say, if we like, that the donkey eats thistles because he is an ass.

WHY DOES VACCINATION KEEP US FROM HAVING SMALL-POX?

There are some diseases from which a person never suffers twice, because the first attack makes the sufferer immune, or proof against a second attack of the particular microbes that cause this illness. Small-pox is one of the diseases against which we can be so protected. But many years ago a famous man named Jenner discovered that it was not necessary to have the actual disease in order to become protected, but that it was sufficient to produce a very slight illness by vaccination. The effect of this was found to be such that people who were properly vaccinated were quite free from the infection of small-pox for some years, generally five years at least. After that the effect is apt to wear off; and so in some countries it is the custom to be vaccinated every five years.

WHY DOES MUSTARD BURN OUR TONGUE?

There are a number of chemical substances which, when applied to the skin or the tender parts of the body, cause us to feel a sensation of burning; and mustard is one of them. It acts upon the tongue or other sensitive parts as an irritant, causing the blood-vessels in the part to swell up and discharge some of their contents. If sufficient be applied this will form a blister. This is what happens in the case of a mustard plaster, where, after the mustard has been in contact with the skin for a little while, we find that a red patch is produced by the swelling of the blood-vessels. This causes pressure upon the nerves, and irritation of the endings of the nerves, with the result that there is a sensation which we describe as burning. Quite a number of other substances besides mustard have exactly the same effect.

WHAT MAKES A WATER-SPOUT?

Just as the waves of the sea are due to movements of the air, so the very astonishing disturbance of the sea called a water-spout is also due to an unusual disturbance of the air. Sometimes parts of the air are started in a twisting motion, rushing through the air and at the same time turning round and round very quickly, somewhat as the earth rushes through space and turns round all the time. When this happens the sea may be very violently disturbed; and sometimes in the middle of this twisting portion of air there is very little air indeed—it is almost like a hollow twisting column of air. Then the water just beneath may be suddenly sucked up so as to fill the almost empty space inside this twisting column of air, and that makes a water-spout.

WHY DOES A FALLING OBJECT TURN ROUND?

The answer to this is that a falling thing turns round only if a turning motion was imparted to it when it began to fall. If we dropped a ball in such a perfectly even way that every part of it was let go at exactly the same moment—though this is by no means an easy thing to do—then it would not turn round as it fell.

But it happens that almost always, when anything is let fall, it is not let go quite evenly, and so a turning motion is given to it, just as it is given to a rifle bullet, and it goes on turning. Even when this does not happen. an object may be so shaped that one part of it offers more resistance to the air than another. That part will be retarded as the object falls, and so it will acquire a turning motion. This turning affects the flight of anything through the air, and if it be a ball affects it the way it bounces. So that in hitting a tennis-ball, or bowling a cricket-ball, we try to "put a twist on it," and this may make it swerve in a curious line as it twists while proceeding against the pressure of the air.

WHERE DO JUMPING BEANS COME FROM?

The jumping beans come from Mexico. It is not the bean that jumps, but a little insect inside it. A tree grows in the Mexican swamps near Alamos which has a curious fruit, three-cornered in shape, and divided into three parts, like little

pods. In two of these pods are small black seeds; the third part contains a tiny worm, and is what we call the jumping bean. Before the tree can have its fruit, it must, of course, bear flowers. A little insect visits those flowers, and in part of each deposits an egg. The part of the flower which contains the egg grows with the rest of the flower, but, instead of becoming a pod for the seed of the tree, it turns into a home for the insect, which is in due course to be hatched from the egg.

Later, the flowers lose their petals, and seed-pods form and ripen. In August the seed is ripe. The husk containing the pods of seed and the little pod with the worm inside drops to the ground and splits into three parts—two of seed and the other that we call the jumping bean. Now, the insect has inherited the knowledge that if the bean lies where it falls it will be trodden upon, perhaps eaten by an enemy. So the worm coils itself up, then lets itself go suddenly, like a catapult, and carries its house with it.

It keeps on jumping until the bean is away from the tree on which it grew. In cold weather the little insect lies still and sleeps. As soon as the weather becomes warm, it revives and starts jumping afresh. If a little hole is made in the bean, the worm spins a web and fills up the hole.

The jumping bean is not the only growth in which insects make their homes. Cherry galls on oak-trees, or oak-apples, as most of us call them, are the homes of insects. A little gall-fly pierces a hole in a twig of the tree and in it lays one egg or more. Either the irritation from the wound in the twig or the action of the egg itself causes the twig to form a growth round the egg, hard and smooth. It is quite a pretty little growth, but inside there is one or more insects. The egg hatches, and a grub appears. It eats the inside of the oak-apple, and then may bore its way out into the world, or it may wait until it has changed into a perfect insect, and then come out. There are scores of sorts of gall-flies, but children will not like any so much as the little worm in the famous jumping bean.

WHAT IS MEANT BY STANDARD RAILWAY GAUGE?

The "gauge" of a railway is the distance between the steel tracks, on which the trains run.

In the early days of railroading, some companies used a narrow gauge, and some a broad one, but this was found to be so inconvenient that a standard gauge of four feet, eight and a half inches was adopted. By this means, passenger cars and freight can be sent from one end of a country to the other without being reloaded, and much expense is saved. The origin of the dimension is rather obscure, but it is said that while George Stephenson was inspecting portions of the old Roman wall, in the north of England, upon which chariots were driven, he measured the width between the ruts worn by the chariot wheels in the stone. As he found this to be four feet eight and one-half inches across, he decided that the Romans must have learned from experience that this width was the most practical, and adopted it.

WHAT IS THE GOOD OF HAVING TWO EYES?

We may say that perhaps it is not worth while having two eyes, since we seem to see just as well with one as with two. But sometimes we may have noticed that we or other people, in pouring milk or putting a lump of sugar into a tea-cup, have made a mistake, and have put the milk and sugar in the saucer. That is what is very likely to happen to anyone who uses only one eye. The two eyes do not look at anything from exactly the same place, but from rather different "points of view," as we say. The brain takes these two "points of view" and sees from both of them together; so that it is very much helped in judging of the distance of things by the difference between the two images of it seen by the two eyes. It is because we have two eyes that we see things in their relation in front of or behind each other. An ordinary photograph looks flat, because, so to say, the camera only saw it with one eye. But if we take two photographs of a thing, from two points of view corresponding to the distance between the two eyes, and then put the two photographs side by side at the right distance, and look at them with both eyes, through the simple little instrument called a stereoscope, or "solid see-er," then we see the view as if it were solid, or see it "in relief," as people say. We see it as we should have seen the thing itself if we had looked at it with our own two eyes.

THE NEXT QUESTIONS BEGIN ON PAGE 2535.

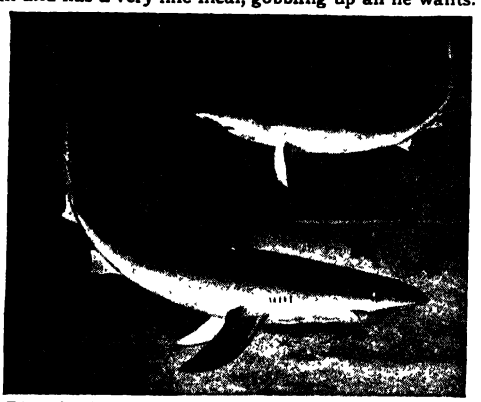
SHARKS, THE WOLVES OF THE SEA



The fox shark, so called from his long fox-like tail, is also called the thresher shark. The latter title describes his methods. Swimming round a shoal of herrings or mackerel, he "threshes" the water with his big tail, frightening the fish close together. Then he darts in and has a very fine meal, gobbling up all he wants.



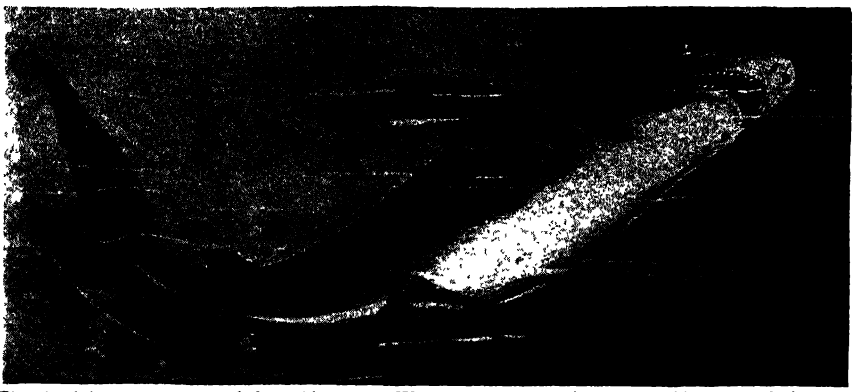
The hammer-head shark is the most curious specimen of the family, and as much feared by men as any.



Blue sharks visit Northern waters, chasing smaller fish right into the fishermen's nets and ruining the latter.



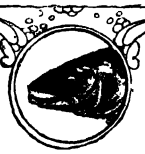
Whales and sharks are alike in this respect, that the biggest of the family are the most peaceful. The big basking sharks are content to take in huge mouthfuls of small fish and to let the rest of animal creation go.



The shark is a creature much feared by men. With one snap of its jaws it can bite a man in halves. The terror of shipwrecked sailors, it is dreaded by all bathers in warm seas and tidal rivers.

BIG FISH OF SEA AND RIVER

CONTINUED FROM 2412



NOW that we come to the fishes proper we have a very big subject. There are fully 9,000 different species of fish in the waters of the world to-day, and in the rocks men have found remains of a thousand more species of fishes that once lived, but have left no descendants like them. If we took the scientific order of classifying fish it would be terribly dull work. All the scientific words are difficult for us to remember, and unnecessary to use at this stage of our study, so we must just learn to know a little more about the fishes themselves, and leave all the technical matter about their scientific classification to later and more serious reading and study.

Naturally, in thinking of the big fishes of the sea our thoughts go first to the sharks. A big hungry shark is the last thing that we should desire to meet in the water. With their frightful teeth they can bite a man in two. Yet even death in that form might be less terrible than by the methods employed by the horrible saw-fish. That cruel wretch really ought to come into this chapter, but we have already seen, on page 1072, what a ferocious creature he is, as well as that other rogue, the sword-fish, and what terrible enemies they are to the mighty whale, so we need add nothing here.

The sharks, big and little, are quite bad enough for one story. Some of them, like the huge basking shark, will not attack a man unless first attacked by him. These have only small teeth, in spite of their enormous bodies, and lie lazily on the top of the water, content with small fishes that swim in shoals, and even tinier things with no backbone. The basking shark grows to a length of more than thirty feet, and has a huge mouth to enable it, like the baleen whale, to take in a great quantity of food at one gulp. Men hunt it for the sake of its oil, of which a large shark yields from a ton to a ton and a half.

The shark of which we have most reason to be afraid is the white shark. The members of this species reach a size which is exceeded only by that of the great whales. One has been preserved which measured 37 feet, but that is by no means the largest of which there is record. Still, that is big enough to do frightful harm to men. These sharks have terrible teeth, set in rows, one row behind another. As the teeth wear out, or become dislodged, they are replaced by others, as in the case of the snake. The sharks have this feature, too, in common with the snake, and all other fishes too, that they do not propel themselves through the water by means of the tail.

Like the eels, they make their way by a wriggling of the whole body, and their great fins serve as balance, as in the case of the rest of the fish family.

The mouth of the shark, as we all know, is placed underneath its body, so that to grasp its prey it has to turn over on its side. This is the one chance which a man in the water has against these monsters. If he has a knife and can swim, he may save himself by diving as the great fish turns, and by stabbing it with his knife. But not every man has the power and the nerve for such a feat.

Very determined creatures are the big sharks; they will follow a sailing-ship for weeks, showing a wonderful power of muscle. Many sailors have a superstition that when a shark follows a vessel it is a sign that somebody on board is going to die. Of course that is all nonsense. Sharks follow vessels because experience has taught them that all manner of garbage, good enough to make a shark a meal, is thrown overboard. If by some dreadful misfortune a man should fall overboard, then woe betide him. The shark will have him, or will, at any rate, snap off one of his limbs.

SHARKS THAT FOLLOW THE HERRINGS INTO THE FISHERMEN'S NETS

We do not often see white sharks off our coasts, a fact for which we have reason to be thankful. But their relatives, blue sharks, visit us. They come after the herring, mackerel, pilchards, and other fish, and follow them into the nets. They have no fear of the nets spread to catch smaller fish. With their sharp teeth they can bite the nets to pieces, while, if there be bait on a line, they cut the line through as easily as if it were made of cotton. They make sad havoc with the fishermen's nets and lines. In the summer of 1916 several swimmers were killed by man-eating sharks on the coast of New Jersey. One shark swam two miles up the shallow Matawan Creek and there killed two people. A number of the sharks were caught and killed. In warm seas the blue shark reaches a length of 20 feet and even more in some cases, and will attack a man as readily as will a white shark.

Another enemy of the fishermen is the fox, or thresher, shark, which has a singularly long tail, of which the upper lobe grows to such a size as to suggest the first name it bears. The second name, that of thresher shark, is suggested by its habits. It swims round and round a shoal of herring or mackerel, and by threshing or beating its big tail on the water frightens them all into a mass, where it can dash in and eat as many as it wants. Nineteen big mackerel and two herrings were taken from the stomach of one of these sharks which was caught.

AN ENEMY OF THE WHALE, AND THE SHARK WITH THE HAMMER-HEAD

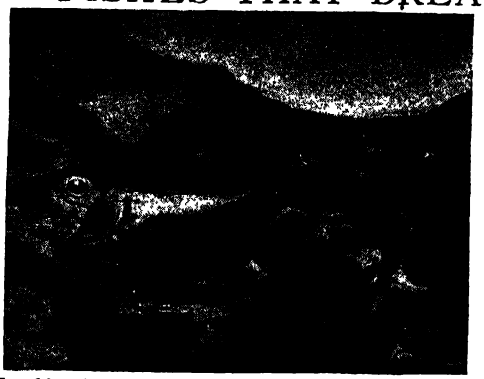
Another of the hungry sharks is the Greenland shark, which reaches a length of 26 feet, and sadly persecutes the whale. With its powerful teeth it can bite huge lumps out of its larger neighbour's tail; and it is so eager to gorge itself with food that it will allow men to approach and spear it while feeding on the body of a dead whale. Perhaps the strangest of all the family is the hammer-headed shark. This has a remarkable head, as its name implies. The front portion of the head grows out into two broad lobes, the eyes being placed at the ends of the two lobes. What purpose this formation serves nobody knows. The mouth is underneath in the usual position, and the brute is as much dreaded by men as the rest of the genus.

To discuss all the different kinds of sharks would be to fill this book. Some in the Indo-Pacific are said to attain a length of 70 feet; others are like great savage conger-eels; others are remarkable for the formation of their jaws, which have the teeth arranged like spiky pavements.

GIANT TEETH THAT TELL US OF SHARKS OF BYGONE DAYS

Between the coasts of Australia and Japan sharks hide in waiting for their prey, clad in skin which looks like rock covered with short vegetation and coral. Many species of sharks have died out, and we are able to trace them only by their teeth. Their bones, as we should call them, disappear. The framework of the sharks is not really bone; it is tough, fibrous cartilage, which in course of time disappears from the skeleton, leaving only the teeth to tell us where the sharks were. Great quantities of these teeth have been found in the rocks of certain parts of Europe, while in Florida they were so numerous that the

FISHES THAT BREATHE LIKE ANIMALS



In olden days men likened the chimera to a hideous monster with a lion's head and goat's body, which breathed fire. Now we call it the king of the herrings.



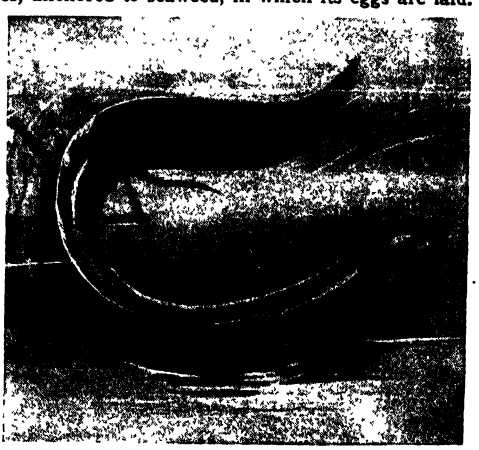
The Australian lung-fish can breathe under water through its gills, but frequently has to raise its head above the water to fill its lungs with air.





We all recognize the dog-fish and call them by that name. They are really small sharks, the only sharks that live off Northern coasts. To the left we have the lesser spotted dog-fish. On the right are two spiny dog-fish. Near the lesser dog-fish we see the pouches, anchored to seaweed, in which its eggs are laid.





Australia has not all the lung-fishes. Here we have, on the left, the African mud-fish, and, on the right, the South American mud-fish. They both possess lungs, and frequently rise to the top of the water to take deep draughts of the air that we breathe. The African fish sleeps in the mud when his river dries up.

rocks used to be quarried in order that the fossil teeth might be sent to England to be ground up for artificial manure. Some of the fossil teeth are five inches long and four inches thick at the roots.

THE GREAT SHOALS OF LITTLE SHARKS THAT WE CALL DOG-FISH

The shark still comes into the market. His skin is spiny, and we call it *shagreen*. It serves for purses and other things, while the cabinetmaker and other workers in fine wood use it as a better sort of sandpaper. To the Chinese the fins of the white shark are precious for soup. The fins are mainly composed of gelatine, and thousands are imported into China every year. That suggests that many sharks must be caught. And that is true. The number caught every year is about 100,000.

This number does not include the dog-fishes. There are millions and millions of those in our own waters. We rarely fish in the sea without pulling up dog-fish. They are sharks just as much as the hammer-head and white shark are, only they are smaller. They have the rough, spiny skin of the true shark, and very valuable it is. Their bodies contain a useful oil, and their flesh is good for food. We knew this years and years ago, but the fish fell into disfavor, mainly because of its name. So nobody but the poorest of the poor would eat it. It was thrown away, or at least it was supposed to be.

But in England large numbers of dog-fish were secretly taken inland, skinned, and sold as another sort of fish, and nobody was the wiser but the fishermen and the dishonest shopkeepers.

THIRTY MILES OF SMALL SHARKS, AND THE BABY SHARK'S CRADLE ON THE BEACH

Lately, people have recognized that the so-called dog-fish is good for food, and thousands are being caught and sold. The dog-fish eat herrings, sprats, and other small fish, and simply teem round the coast. They fill the fishermen's nets; they swarm upon his lines. Once 20,000 were taken in a single boat's haul, and a shoal of them was seen—an unbroken mass, twenty or thirty miles broad. No wonder that when shoals like this invade the fishing-stations the fishermen have sometimes to suspend their operations.

The dog-fish are true sharks in the way they deposit their eggs. These appear in tough pouches, which we find on the seashore, and call mermaids' purses, sailors' purses, or sea-purses. From the corners of the purses little tendrils extend By these the pouch of eggs is anchored to seaweed, and the mother fish hovers round to see that no harm befalls. Those that we find contain, as a rule, no eggs, but are simply the empty cases from which the baby shark has disappeared.

A near ally of the sharks is a singular fish called the chimera. It is the only fish which, as far as we know, produces eggs which imitate their surroundings. These are oval in shape, and bordered with a fringe, so that the egg-case floats about like a piece of seaweed until the little fish is ready to emerge.

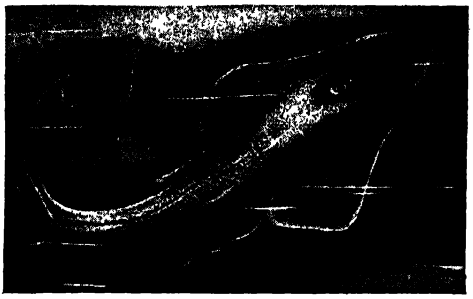
THE HIDEOUS CHIMERA AND ITS EXTRAORDINARY COUSINS IN THE RIVERS

The chimera is one of the ugliest fishes, and has fallen low in the scale of life. It is a higher form than the shark, from which it is descended, but now it reaches only five feet in length, whereas in the old days there were giant chimeras. Those who named the fish likened it to a mythical monster called the chimera, which, they thought, had the head of a lion, the body of a goat, and the tail of a dragon, from whose nostrils fire issued. Modern sailors have called it the king of the herrings, because of its habit of feeding upon those fish.

Not only is this fish related to the shark; it is related also to the lung-fishes. These in themselves resemble, to a small degree, the sharks, though there is so little in common between them that they are placed in different classes. The lung-fishes, as their name suggests, breathe by the aid of lungs, which means, of course, that they must rise to the surface of the water and draw their supply from the atmosphere. There are three known sorts. There is the great six-feet lung-fish of the Australian rivers, there is the mud-fish of the South American rivers and swamps, and there is the African mud-fish.

The Australian species can obtain air under water by means of gills, but they have to rise now and then to the top to breathe. The American and African species are not so fortunate, but must rise frequently to the surface of the

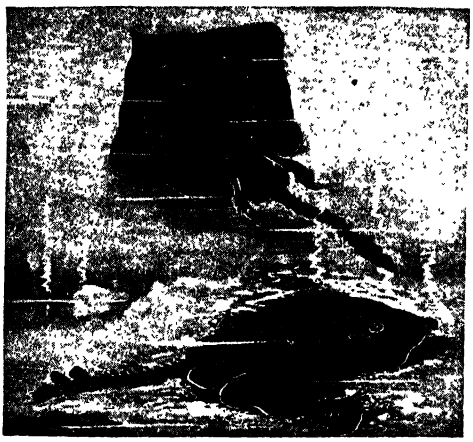
FISHES THAT CARRY ELECTRICITY



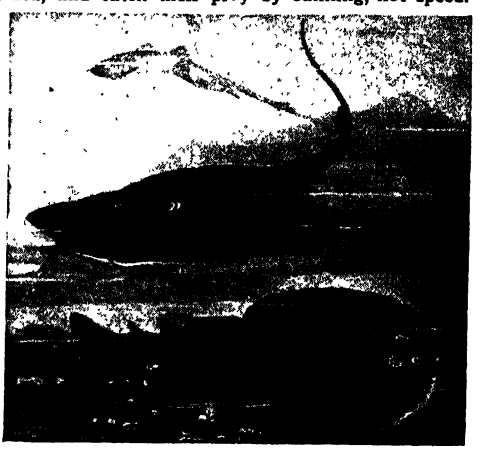
The rays are related to the sharks and to the skates ray on the right. They live at the bottom of the sea, and catch their prey by cunning, not speed.



Here we have the halavi ray on the left, and the Indian



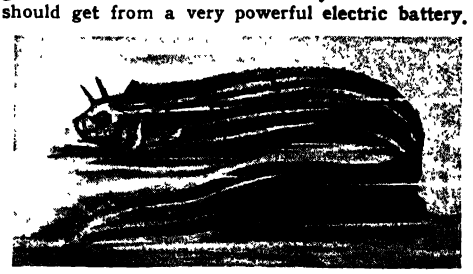
The thorn-back skate is heavily armored on the back, and sometimes on the sides of the head, with claw-like spines. The males have sharp pointed teeth, but the females' teeth are blunt and flattened.



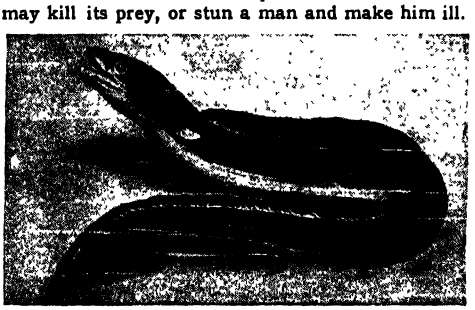
Here we are shown the common skate and also, close by, the famous marbled electric ray, which gives forth electric shocks exactly like what we should get from a very powerful electric battery.

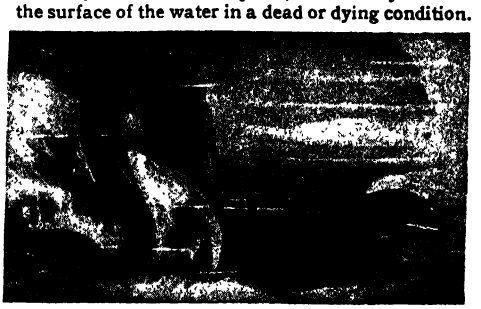


The electric eel is not an eel at all, but is related to the cat-fish and the carp. Its electric shocks may kill its prey, or stun a man and make him ill.



The ribbon-fish is very long, but very thin. It lives far away down in the deep sea, and is only seen on the surface of the water in a dead or dying condition.





Two famous eels now wait to be seen. The first is the conger ; the second is the murena. Congers are abundant in most seas. They form excellent food for man, and we must think well of them because they destroy the horrid cuttle-fish. The murena is a sea-eel, six or eight feet long, with big sharp teeth. It savagely attacks men in or out of the water. It is beautifully colored and spotted and looks like a snake.

water to take in air. The South African mud-fish must be considered in advance of his fellows, for when the rivers in which he has his home dry up, he makes himself a sort of nest in the mud, and goes to sleep, caring for nobody. When the waters refill the river channel, he revives, and sets to work to eat and get fat again, like a bear which has been sleeping away the winter.

FISH THAT TRAVELED ACROSS THE WORLD ALIVE IN CLODS OF MUD

A peculiar feature of these strange fishes is their teeth. These make its mouth a great grinding mill. The teeth are shaped like the antlers of deers, and they fit together, so that shell-fish of quite large size can be easily crushed. When they are out and about the lung-fishes need much food. Their fasts are long. Some of them were dug up from the mud and sent in their clods to Europe. There they were put into a big tank in a hothouse, and revived at once, and began to eat the snails, worms, and small fish thrown to them. When these supplies ended they calmly set to work to eat each other.

The appetite of the lung-fishes must not surprize us. All sea-fishes are hungry creatures. The deeper we go, the more hungry we find them. Their food has mostly to come from the sea above them, and as many fishes are on the look-out at all depths, there is a chance that those in the lowest levels may often have to fast. Hence they have developed an elastic stomach which can extend in the most marvelous way when food does come, like that of the great snakes on land.

THE UGLY RAYS AND SKATES THAT STEAL ALONG THE BOTTOM OF THE SEA

In one, only four inches long, there was found another fish seven and a half inches long, curled up like a ball in the other's inside. Another—a six-feet creature—called the Plagyodus foxus, was found to contain several cuttle-fish, many shell-fish and sea-squirts, twelve young boar-fish, a horse-mackerel, and one of its own species.

Passing now to other members of the shark family, we come to the rays and skates. These are ugly, sluggish things, which move stealthily at the bottom of the sea. They use the tail as a rudder, and swim by gently moving their fins. Every aquarium has some of these fishes. As they cannot swim quickly, they have to depend largely upon low forms of fish-life, such as backboneless creatures and shell-fish, for their food. But they are colored so nearly like the mud over which they move that at times they deceive bigger fish into approaching. The ray cannot grasp its big prey as other fish can, for its mouth is below; so it darts over it, holds it down by weight, and then grabs it with its mouth.

The skate is common enough in our fish-market, and, though it is not delicate fare, poor people are glad enough to eat it, taking care not to swallow the sharp spines with which its back is armed. We have seen an egg of the skate on page 1420. They much resemble those of the dog-fish, but instead of streaming tendrils at the four ends, they have short ends, like handles, to what appears a small, inflated stretcher. Skates reach a length of from two to four feet, but one has been caught which weighed as much as 90 pounds.

THE FISH THAT CAN STUN A MAN WITH AN ELECTRIC SHOCK

The most remarkable member of the ray family is the electric ray, or torpedo. Like the electric eel, it has all the properties of an electric battery. By some marvelous means it has produced electric cells from the muscles of its body, which enable it to stun and kill a fish, and paralyse a man's arm if he completes the circuit by touching it with two hands. The electricity from these fish will decompose water, just as the electric spark set up by the man of whom we read in the story of the men who found electricity, told on page 2161. It can decompose chemical compounds and actually produce a spark. The strength of the shock it gives is sufficient to make a man quite ill for days. How their power works against other fishes may be judged from the fact that an electric ray has been found to contain a two-pound eel and a one-pound flounder, while another had a four-pound salmon in its stomach.

Bad as is the electric ray, the shocks which it can communicate do not compare with those of that terror of certain South American rivers, the electric eel. The nerves of the electric organ in the electric skate arise in the brain; in the electric eel they come from the spinal

cord, and over two hundred such nerves have been counted. Their power is amazing. An old story is told in very many books that, when the natives of Brazil want to catch these fish, they drive horses into the rivers, which are attacked so fiercely by the eels that the latter lose their power, and may then be handled with safety. Some of the horses, it is said, are killed by the shocks.

FIFTY KINDS OF FISH THAT STORE UP ELECTRIC ENERGY

Happily, there seems to be no foundation for the tale. But that the eel does lose its power we know from careful experiments. It has a certain amount of energy stored up, and when this is first tapped, it can give so serious a shock that several persons holding hands feel it. When this power is exhausted, the eel must rest before it can give further serious shocks.

Quite fifty different kinds of fish can give electric shocks, but the only serious trouble of this sort is that caused by the ray, the eel, and the malapterurus, or thunderer fish, of the Nile. Here the current comes from two enormous nerves, one on each side. Both the thunderer and the eel are more powerful than the skate, yet the latter can by a single discharge disable a full-grown man. We do not know where these strange creatures got this mysterious power from. The ancients knew of it, and used the electric discharges of the electric ray and eel for curing illness. Since 1772 the subject has been carefully studied by scientists, but though we know all about the structure in which the wonderful power resides, we are still no nearer to learning how it began.

THE STRANGE LIFE-STORY OF THE MYSTERIOUS EELS

All the eels have been a source of mystery. For ages men could not understand them. They hide in the mud by day and come out to feed only at night, so they were difficult to study. But the mystery has now been solved. Eels are born at sea, and millions upon millions of them come up the rivers in the spring. Their numbers almost pass belief. It is believed that an eel of average size may produce at least five million eggs, while twenty million may be produced by a very large one. If the spring migration be large the young fish may pass in an unbroken line for weeks on their way up to the headwaters of a river.

Their habits are not like those of ordinary fish. They climb water-gates; they swarm over all sorts of obstructions; they climb the banks and make their way over wet fields and dewy grass to the place to which they wish to go. Those which come up the rivers are supposed to be mostly females. Nearly all the young males remain in the sea or at the mouths of the rivers. They live in fresh water perhaps eight or ten years. Then, when they are fully grown, they swim out of the lakes, down the rivers and out into the centre of the deep Atlantic where they lay their eggs and die. No eel ever comes back. They must have sea-water in which to spawn.

This is not the way the conger-eels live. They are the big people of the family, and always remain at sea. They live on cuttle-fish, octopuses, and so forth, and as they are bold and hungry, they are terrible foemen. But they are not so much to be feared as the murena, the great sea-eel with huge teeth, which it uses without distinction upon man or fish.

THE FIGHTING CONGER-EEL, AND THE STRANGE RIBBON-FISH

The congers are bad enough. When pulled up on a fisherman's hook they fight in the boat with great strength, and will bite with the fury of a young bulldog. The sea-eels are clean feeders, but those which come up our rivers, not satisfied with small water animals and the eggs of other fish, delight in the flesh of dead bodies which may be floating in the water.

Many of us, seeing a ribbon-fish for the first time, might take it for an extraordinary form of eel. Its long, thin body does suggest that idea when only one view of it is seen, but upon a closer view we find that, though the whole body is from 15 to 20 feet in length and a foot in depth, the width is only an inch or thereabouts; hence the name ribbon-fish. It belongs to the spiny-finned group, and is related to that remarkable creature, the unicorn-fish, so called from its remarkable spine, which curves like a crest from the tip of the snout back over the head. This is only about a third of the length of the curiously-shaped ribbon-fish.

The ribbon-fish has been responsible, it is believed, for more than one story of the sea-serpent. Sir Richard Owen, who did not believe in the existence of sea-serpents, declared that one story of the supposed appearance of this monster lay in the fact that a ribbon-fish, sporting on the top of the waves, had been sighted. He may have been right. But it has since been discovered that the ribbon-fish, if seen on the top of the waves, must have been dead. It is one of the deep-sea creatures, and cannot exist near the surface of the waves.

Dead ribbon-fish, which have been discovered cast up on our shores, have been so utterly shattered, through the pressure of the water being withdrawn, that it has been impossible to take them from the sea, their flesh being utterly broken up. When young, their flesh is so extremely thin and filmy that, if they did not live at the bottom of deep seas, where there is little movement of the water, they would be washed to pieces.

THE TERROR OF THE CUTTLE-FISH, WHICH CAN PULL DOWN A BOATFUL OF MEN

Whether there really is such a thing as a sea-serpent we do not know. For hundreds of years men have told of seeing such monsters, but there has generally been an explanation showing that a mistake has been made by onlookers. A couple of blue sharks floating with their fins high in the air have been proved to be what men mistook for a sea-serpent. A line of gamboling dolphins has misled other mariners. Then there can be no doubt that the enormous squids seen far out at sea have caused other errors.

There are many cuttle-fishes off our own coasts. A huge squid with arms 24 feet long has been caught off the Newfoundland shore. Giants of the family live in the Pacific and Indian Oceans, and are the most loathsome things in the sea.

So hideous and repulsive are they that men call them devil-fish. It is impossible to think of a more dreadful creature. Some have huge bodies 19 or 20 feet in length, with a powerful parrot-like beak and a cruel rasping tongue. They have eight or ten terrible arms. These arms in the biggest species are 40 or 50 feet in length. These are armed with suckers, and have claws like a tiger's. The octopus lurks in waiting for its prey. When this approaches, the terrible arms of the monster are shot out, the claws cling, the suckers make fast. Even a little cuttle-fish clings so fast to one's hand that its tentacles must be cut one by one to make it let go. But with a big one grappling no man could escape. They are said to be able to pull down a boat and all its crew with their fearful arms; and no wonder, when we read of their being able to engage in battle with the great toothed whale.

A FIGHT TO THE DEATH BETWEEN TWO OCEAN MONSTERS

Mr. Frank Bullen, who was for many years a sailor, and afterwards wrote some fine books, saw one of these terrible fights while he was at sea. The battle was between a fierce sperm whale and a giant squid. The arms of the monster were twined about the great whale's huge head. Might not these great writhing tentacles suggest a sea-serpent? Such a sight would make an unpractised observer believe that the fabled monster was actually before him.

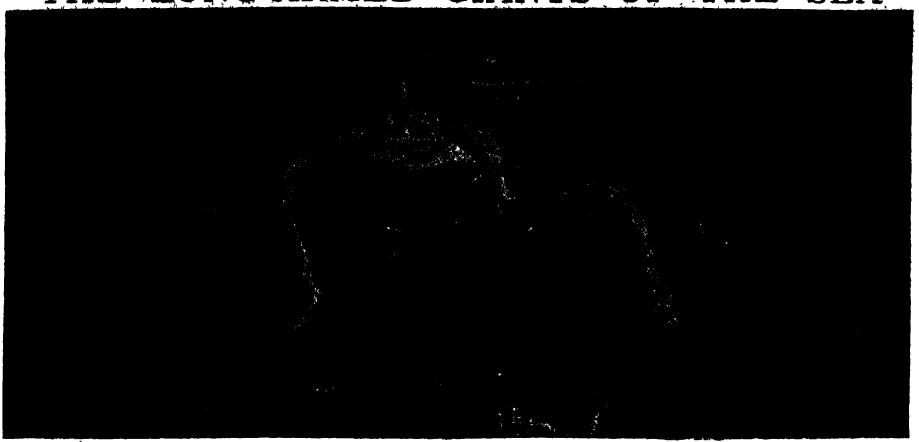
The squid which Mr. Bullen watched had a head big enough to contain 350 gallons, and its eyes measured a foot in diameter. The whale won the battle; it was eating the cuttle-fish as Mr. Bullen watched. We may remember the story of three men who were painting the sides of a ship, while the vessel was becalmed at sea, being swept off the vessel by the arms of one of these dreadful creatures and drawn down into the sea. The sailors on board tried to save their unfortunate comrades, and cut off one of the creature's arms with a hatchet. It was as thick as one of the masts of the ship, and the suckers on it were as big as saucepan-lids.

THE CURIOUS INK-BAG WITH WHICH THE CUTTLE-FISH DEFENDS ITSELF

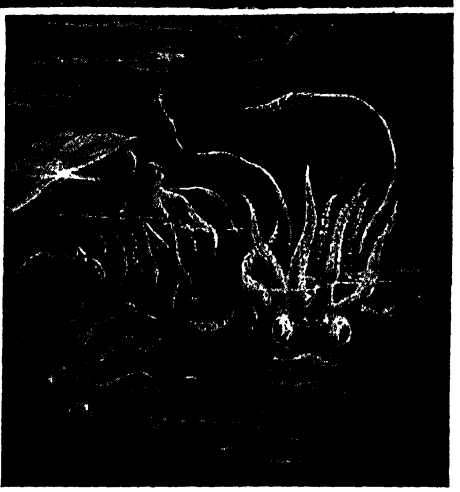
All cuttle-fish carry an ink-bag as a means of defence. If they are about to be attacked they squirt out this liquid, turning the water round about them quite black. The little cuttle-fish that are used as bait do this. They have in the midst of their bodies a little shell-like bone of chalky substance, which is often used in tooth-powder. The ink which the octopus carries is called sepia, and is used by artists.

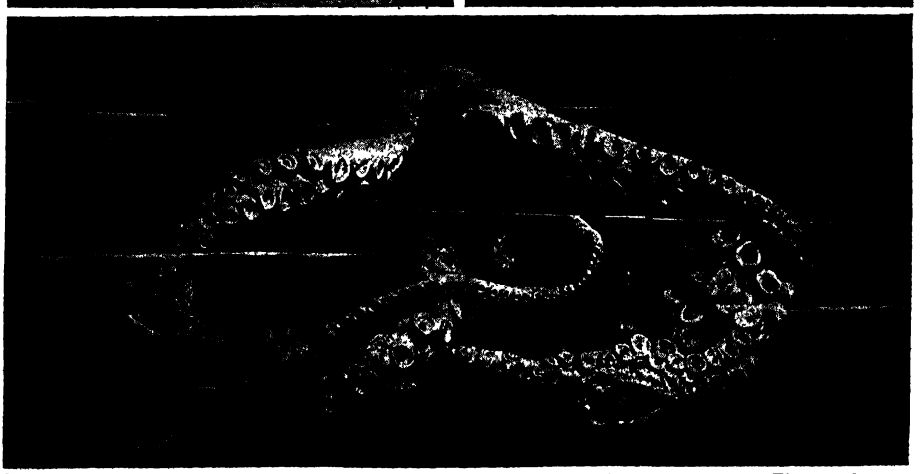
THE NEXT STORY OF FISHES IS ON PAGE 2601.

THE LONG-ARMED GIANTS OF THE SEA







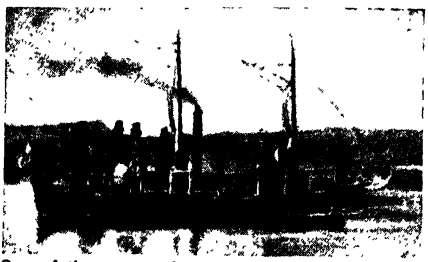


Of all the deep-sea monsters none horrify us more than the great squids and octopuses. They are hungry creatures, and with their parrot-like beaks and their rasping tongues, which are like terrible files, they devour any living creature that they can master. With their fearful arms they cling like serpents. Their hold is sure, because each of the terrible arms has many suckers, which cling so tightly that a man, to escape, must cut himself free with a knife or axe. The squids and octopuses and small cuttle-fish are all constructed on the same plan. Each carries a bag of ink, and when pursued squirts out the ink, so darkening the water and rendering escape easy. The ink which some octopuses carry is the sepia that we use in painting.

THE FIRST STEAMBOATS EVER MADE



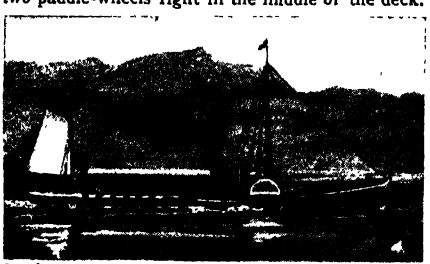
Although the honor of building the first steam-propelled vessel has been claimed for several different men, yet it probably was an Englishman, named Jonathan Hulls, who built the first steamboat, in the year 1706. Here we see Hulls' own drawings of his vessel, which are still in existence in the patent office.



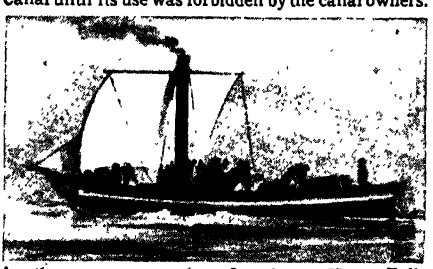
One of the very early steamboats was built by a Scotchman, William Symington, in 1788. It had two paddle-wheels right in the middle of the deck.



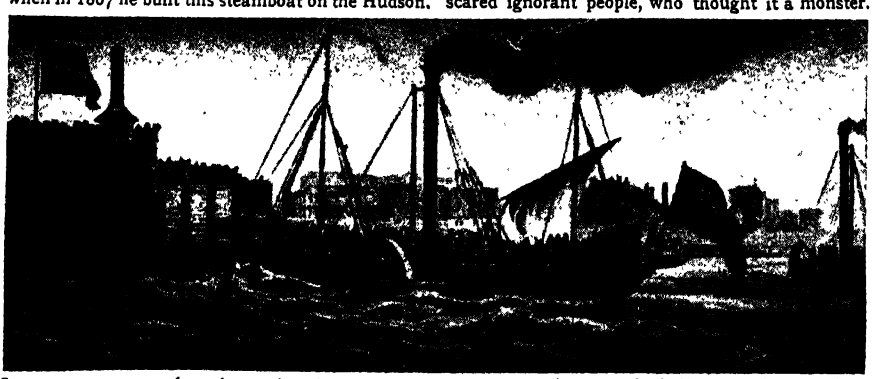
In 1803 Symington built a steamboat for Lord Dundas, and it towed barges on the Forth and Clyde Canal until its use was forbidden by the canal owners.



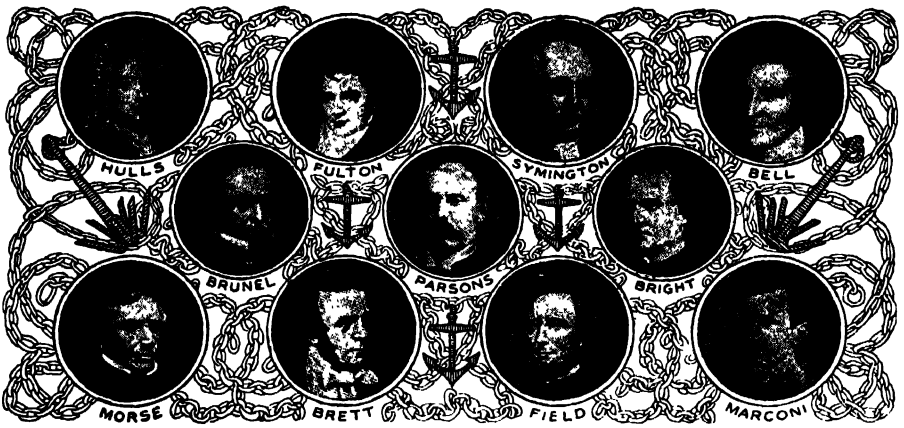
An American inventor, Robert Fulton, was the first to make steam navigation commercially successful, when in 1807 he built this steamboat on the Hudson.



Another success was by a Scotchman, Henry Bell, who built this ship, called the Comet, in 1812. It scared ignorant people, who thought it a monster.



Inventors were now busy improving the steamboat, and steamers began to be built everywhere. When steamboats appeared on the Thames, there was much opposition from the boatmen. By 1837, however, steamboats ran regularly from London to Margate, and here we see two steamers approaching Margate Pier.



CONQUERORS OF THE SEA

CONTINUED FROM 2444



IN reading the adventures of Robinson Crusoe we all feel thankful on coming to the part where he is saved from the sea. But when he settles down on his island, gloom at first comes upon us, for there he is in that desert spot, alone, surrounded by the sea. It is a dreadful position for a human being, so lonely, so hopeless. Well, suppose there were no ships, no balloons, and no aeroplanes, the inhabitants of Great Britain, for example, would be forty million Crusoes. They could not send letters to their friends abroad. Their Colonies would be of no use to them, for there would be no means of sending settlers to them; nor, if the people were already there, of exchanging goods or messages with them. "There would be the telegraph for communication, would there not?" asks someone. But if we had no ships we should have no telegraph across the seas, for we should never have been able to lay the cables.

With no ships and no telegrams the sea would be a source of horror to us. It would be a fearful void, shutting us out from communication with other parts of the world. And that is just what the sea was to men before they learned the art of shipbuilding and navigation. By a series of grand schemes men have changed all this. There was the gradual building of great ships; there was the making of accurate instruments by which men could tell at any moment of the day or night their exact position at sea, no matter how far they went; there was the application of steam to the purpose of the ship; and there was the laying of the ocean cables.

These things accomplished, the sea remained no longer an enemy. The ocean became a roadway, leading to all parts of the world. Storm and tempest, fogs and hidden rocks, still cause disaster, it is true, but the accidents are rare, considering the enormous number of ships there are. The sea has become one of our best friends.

And all this wonderful change in our affairs we owe to a very small number of men. It will be enough for our purpose if we glance briefly at the careers of the chief figures in these revolutions in the history of the world.

Every time that some great change has been proposed for the benefit of mankind, people with power and influence, who ought to have given their encouragement and support, have always been among the first to say: "It can't be done," and

"It shan't be done." That is just what happened concerning the steamship and the ocean telegraph. Take first the steamship. No invention ever had a harder struggle for life. Fate and men both seemed against it.

THE MAN WHO FIRST MADE A MACHINE DRIVE A BOAT THROUGH WATER

The Spaniards say that a countryman of theirs, named Blasco de Gary, who lived in the sixteenth century, made a model steamboat in 1543. But we have to be careful about believing stories of this sort without clear proof. It is almost quite certain that though the boat had paddle-wheels, they were not worked by steam.

A century later, Denis Papin, a famous Frenchman, appeared on the scene. He was a physician, born at Blois in 1647, and he died in England in 1712. A very talented man, he was associated with several of the famous men of whom we have read in the story of the men who found electricity, told elsewhere. Frenchmen declare that he invented the steam-engine and steam navigation, and in many books his name is given as having achieved that result. But that is wrong. He was a man of splendid brain, but his thoughts did not turn to the making of a true steam-engine as we know it. What he invented was an engine worked not really by expanding steam, but by atmospheric pressure. His idea was a brilliant one, and it led to great things in the hands of Newcomen, Brindley, and Smeaton. We must remember that it was not the true steam-engine; but as his engine, such as it was, was fitted to a model boat and drove the boat through the water, Papin well deserves his place in the gallery of heroes who brought about steam navigation.

TWO GREAT INVENTORS WHO WERE RUINED BY THE FRENCH REVOLUTION

Many names appear for a little time upon the page of the history of this invention. One of them, Jonathan Hulls, patented a sort of steamboat in England in 1736, but years were to pass before anything practical was done. More men crowded to the task, and we find several skilled inventors working in rivalry at the same time. One of these was the unfortunate Marquis de Jouffroy, who, born in France in 1751, set himself, at 26, the task of driving a boat by steam. He adopted Papin's idea, and in eight years made three successful boats. The first was 40 feet in length; but it was the third which is said to have been the first real steamboat. He might have gone on to complete success, but the French Revolution drove him, an exile from his country, to America. When he returned to France, he was too late; others had seized his ideas and begun to reap the honors which should have been his. He died in 1832.

At about this time two American engineers, named James Rumsey and John Fitch, were making experiments. Rumsey is of importance to us as being the man who first turned the attention of Robert Fulton to the subject. Fitch came into prominence in the American Revolution, acting as gunsmith in the Revolutionary army. His first model steamship was made in 1785. The next year he built another boat with paddle wheels, and in 1790 one of his boats carried passengers on the Delaware. He went to France just as Jouffroy was leaving, and, like Jouffroy, was ruined by the Revolution. It is said that while he was there his plans were shown to Fulton. Anyhow, he returned to America starving, and killed himself.

THE PAINTER OF PORTRAITS WHO BUILT A STEAMBOAT

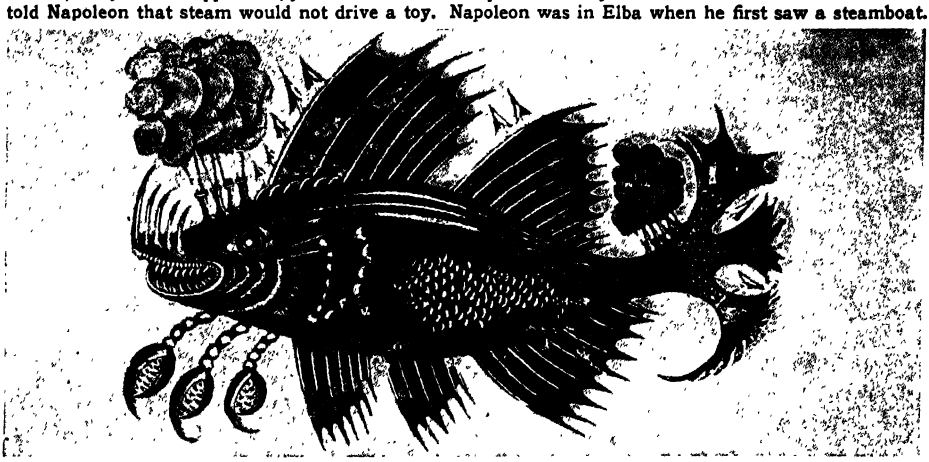
It was for something quite different from shipbuilding that Robert Fulton went to England. He was a painter of portraits, born in Pennsylvania in 1765, but set out for England in 1786, in order that he might study this art under Sir Benjamin West. He became acquainted with Rumsey, who had also gone to England earlier, and, after discussing inventions with him, gave up all thought of painting. Fulton's brain teemed with ideas. He invented things for the improvement of canals, for cutting and polishing marble, for twisting rope, for iron bridges, for spinning flax, for dredging rivers, and for making boats go under water and blow up ships. But the great work of his life was done for the steamship.

In 1803 he built a steamship, but its engine was so heavy that it fell through the bottom of the vessel into the River Seine, in France, where he was trying it. He did not lose heart, but recovered the

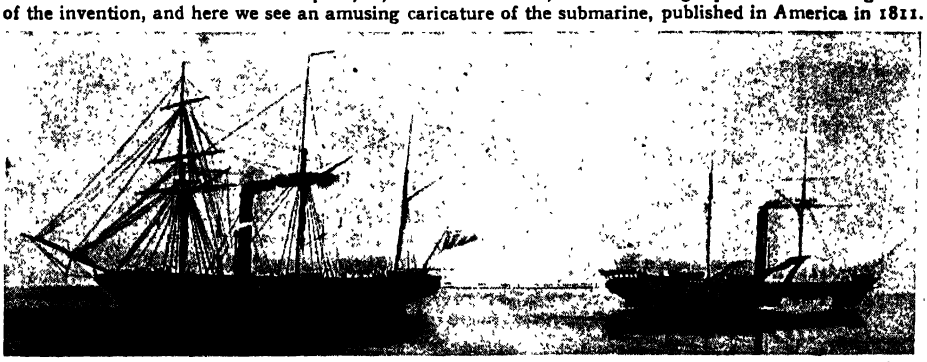
HOW NAPOLEON LOST STEAM POWER



Fulton, the American, went to France and offered to build a steam navy for Napoleon. "Great man," said Fulton, "if you will support me, you can have the most powerful navy in the world." But French scientists told Napoleon that steam would not drive a toy. Napoleon was in Elba when he first saw a steamboat.



Fulton also invented for Napoleon a submarine boat, and, with three friends, he remained under water for one hour. This boat was to fire a torpedo, or, as Fulton called it, "a carcase of gunpowder." Nothing came of the invention, and here we see an amusing caricature of the submarine, published in America in 1811.



A great step forward was taken when men learned to drive a boat by a propeller at the end, instead of by paddle-wheels at the sides. Both methods had their supporters, and in 1845 there was a great test, resulting in a triumph for the propeller. Two steamships, the Rattler, the first warship with a propeller, and the Alecto, a paddle-boat, had a tug-of-war, as shown here, and the Rattler pulled the Alecto quite easily.

* Copyright by The Century Co.

engine and built it into a stronger boat. This he made to move, but it was too slow to be successful. Going back to England, he prepared plans and had an engine built by Boulton and Watt, of whom we have read in another part of our book. Then he came to America and left the engine to be brought over, packed up in a ship. When it arrived, he set to work to put it together. His story, told in his own words, gives us an excellent idea of the hard lot of the inventor of those times.

ROBERT FULTON'S FIRST STEAMER, AND THE SCOFFING OF STUPID MEN

"When I was building my first steamer in New York," he wrote, "the work was viewed by the public either with carelessness or contempt, as a useless scheme. My friends, indeed, were civil, but they were shy. As I had occasion to pass daily to and from the building yard while my boat was in progress, I often loitered unknown near idle groups of strangers, and heard them scoff and sneer and ridicule. Never did a single encouraging remark, a bright hope, a warm wish, cross my path. My work was always spoken of as Fulton's Folly."

But at last the ship was built, and set out with passengers for a trial trip. The vessel moved off, went a little way, then stopped. Everybody except Fulton thought that this was the end — that he had failed, as they all had expected. But he went below and soon put right some trifling mishap, and the boat steamed away, while people were saying: "I told you it would be so; a foolish scheme; I wish we were safely out of it." The vessel went its way, a journey of 150 miles in 32 hours. Fulton was delighted, but though the return trip to New York was made in two hours' less time his friends still doubted, and thought that it could never make another trip. No wonder he felt discouraged. He himself wondered if such a voyage could be repeated, and if it could, whether it was of any value.

WHY ONE OF THE EARLY STEAMBOATS WAS ALLOWED TO FALL TO PIECES

Fulton was the first man, therefore, to make steam navigation what we call a commercial success. Fitch had shown that something of the sort could be done, but Fulton profited by Fitch's experience and by that of Jouffroy. He died in 1815, but not until he had built several other boats.

Fulton's successful steamer was launched in 1807. Nineteen years earlier a successful steamer had been launched in Scotland, but this was not a commercial success. It was built by William Symington, a Scotch mechanic, who was born in 1763, and died in 1831. He first of all built a steam-engine to run on the roads, then carried out the building of the steamship for a thoughtful Scotsman named Patrick Miller. Symington's vessel for Miller was succeeded by another which he built for Lord Dundas. It was launched on the Forth and Clyde Canal, and, without any trouble, towed two barges, weighing together 140 tons, a distance of 20 miles against a powerful wind. This was still five years earlier than Fulton's success. But what happened? The owners of the canal said that the steamer would create such a current that it would wash away the banks of the canal, and so this fine steamer was run aground and allowed slowly to fall to pieces on the bank of the canal. Fulton saw this vessel, and doubtless gained a hint or two from it.

A POOR MAN WHO CONFOUNDED THE WISDOM OF THE WISE

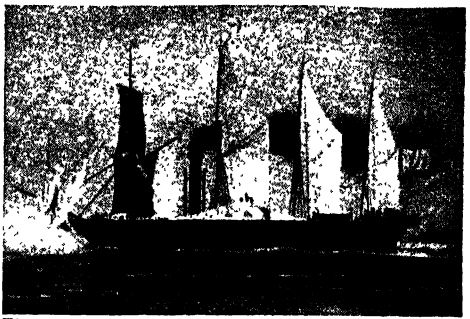
But Symington's work was not all wasted. One of the men employed in making the woodwork of his first vessel was Henry Bell, the son of poor Scottish parents. Born in 1767, he followed first one trade and then another, and seemed unlikely to do any good until he was brought face to face with the problems which the luckless Symington was trying to solve. Symington's experiments convinced Bell that success might yet be gained with steam-vessels, and for the next thirteen years he gave all his thoughts to the plan.

We hear of him in 1800 trying to make the British Government believe in the possibility of the scheme, but he was unsuccessful. How could he hope to succeed in official circles when one of the greatest and best men of the day—Sir Joseph Banks, President of the Royal Society—could say to all the proposals for vessels driven by steam-engines: "A very pretty plan, but there is just one point overlooked—that the steam-

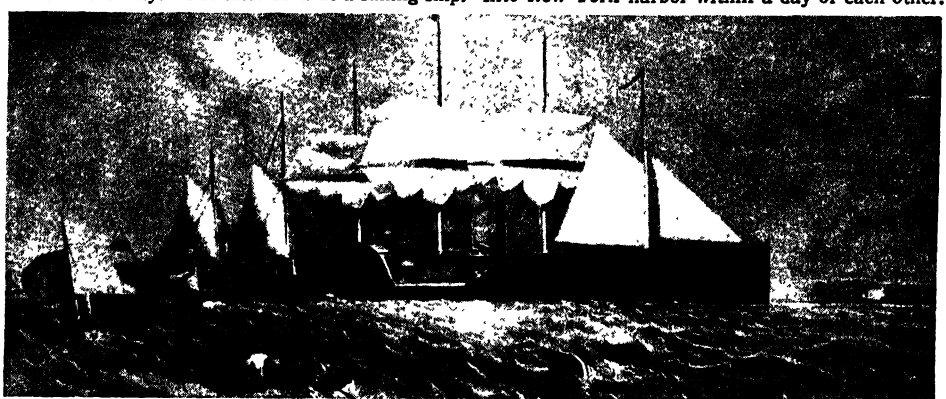
THE COMING OF THE GREAT STEAMSHIP



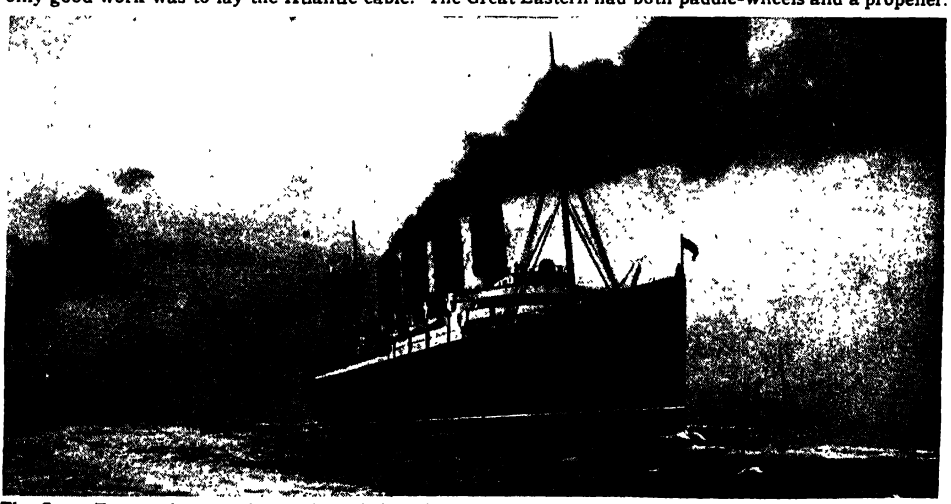
The Americans claim the honor of sending the first steamship across the Atlantic. The Savannah, shown in this picture, was fitted with engines, and crossed the Atlantic in 1819 in 27 days, but used her sails most of the way. She later became a sailing ship.



The honor of sending the first steamship across the Atlantic ocean perhaps belongs to the British, for in the year 1838 two English steamships, the Great Western, shown here, and the Sirius, steamed into New York harbor within a day of each other.



When the Great Eastern was launched at Millwall, London, in 1857, it was the wonder of the world, and no one thought such a monster could be surpassed. Its length was 680 feet, an eighth of a mile, and the engines were 1,000 horse-power. This ship cost nearly five million dollars, but it was always having accidents. Its only good work was to lay the Atlantic cable. The Great Eastern had both paddle-wheels and a propeller.



The Great Eastern has now been left far behind in size, the mammoth liners of to-day, like the Mauretania and the Vaterland, being much longer than the Great Eastern, and their engines being many times more powerful. In this picture we see the Mauretania leaving the River Tyne, where she was built in 1907. She has beaten all previous records by crossing from Queenstown to New York in 4 days, 10 hours, 41 minutes.

The photograph of the Hon. C. A. Parsons, on page 2487, is by Elliot & Fry, and that of Signor Marconi by Lafayette, London. The photograph of the Mauretania is by Messrs. Thompson & Lee, and the top two pictures on page 2489 are from the Century Magazine.

engine requires a firm basis on which to work." Talented man though he was, Banks himself overlooked one point, that even though it floated on water, the hull of a ship does give the firm basis the steam-engine requires. Bell gave up hope of encouragement from the Government, and when he had managed to get some money, he set to work in 1811 and had a little steamship of his own built on the Clyde.

HOW SCOTTISH INVENTORS AND ENGINEERS LED THE WAY WITH STEAMBOATS

The ship was called the Comet, and was launched in January, 1812, beginning at once to carry goods and passengers on the Clyde. Great was the terror that it created among ignorant people. They thought, as they saw it puffing along, snorting sparks and smoke, and going against the wind and the tide, that it was some evil monster. When it approached the shore to pull up, they ran away and hid themselves.

News of the Comet's success soon spread abroad, and in the year 1813 the first of the Thames steamers was run by a man named Dawson, while a courageous man named Lawrence, of Bristol, sent up a steamer from his native city to carry the people of London up and down their great river. The opposition of the Thames boatmen proved too much for Lawrence, and his vessel had to return to the River Severn. But the steamship industry was now fairly founded, in spite of the "wise" men and the Government; and many ships were built on the Clyde to run between Glasgow and Liverpool and other ports.

The success of the Glasgow-to-Belfast boat in 1818 was important because this was the first ship to go out from the coast regularly, making a port in another island its goal. The owner of the Rob Roy, as it was called, was David Napier, a first-rate engineer of Glasgow. It was built by William Denny, of Glasgow, from whose works came several other steamers which set all the world wondering.

THE FIRST CROSSING OF THE ATLANTIC OCEAN BY STEAM AND SAILS

James Watt, whom we met on page 600, played an important part in the development, his steam-engines being largely employed. He was one of the first men to cross to the Continent by the new method, a steamship taking him to France in 1817.

From this time forth there was no more opposition to the steamship as a means of sea passage. The next important step was its first voyage across the Atlantic. This was made by an American ship called the Savannah, but she did not steam all the way. She was built as a sailing ship by Francis Fickett, of New York, in 1818; but it was decided afterwards to fit her up with a steam-engine. This was done, and she set sail for England from Savannah on May 24, 1819, reaching Liverpool twenty-seven days after.

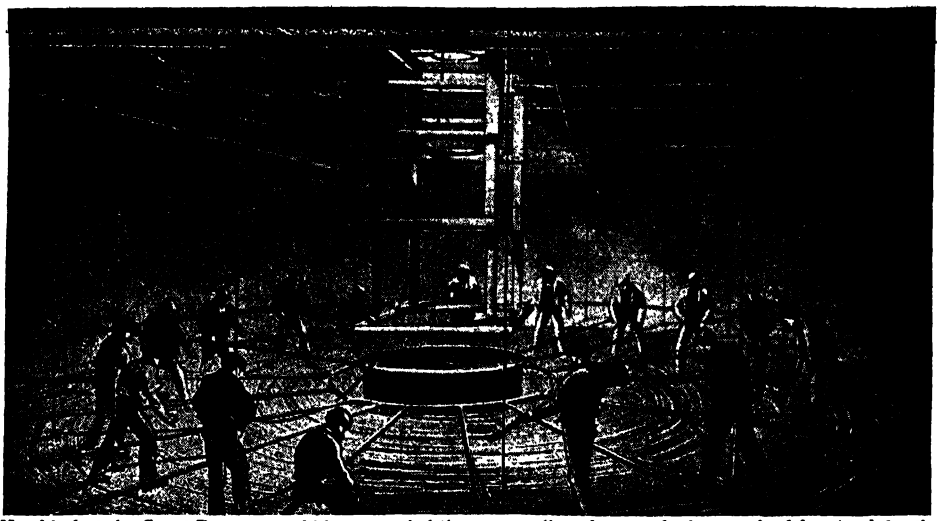
The greater part of the distance had been covered by the help of sails, steam having been used only for eighty hours. The Savannah returned to America and was not considered useful, for her engine was taken out and she depended, until she was wrecked, upon her sails. Therefore, although America claims to have sent the first steamship across the Atlantic, we must remember that she sailed for the greater part of the voyage, and steamed only a little now and then, about one hour's steaming for eight hours' sailing. Six years afterwards an English yacht, named the Falcon, went by sails and steam to India.

HOW TWO REAL STEAMSHIPS REACHED NEW YORK ON ONE DAY

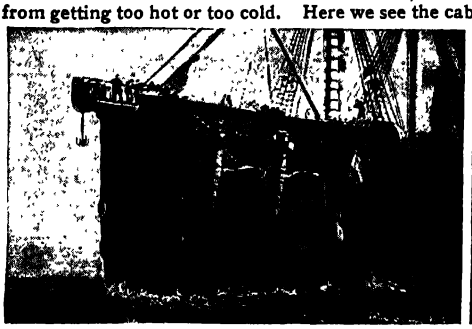
The first crossing of the Atlantic by a real steamship was completed in 1838, when, on the same day, two English vessels steamed into New York. They were the Great Western—a steamship built by Sir Isambard Kingdom Brunel, whom we have already met on page 605—and a smaller vessel, called the Sirius. The Sirius had started from England three days ahead of the Great Western, but the Great Western, being bigger and stronger, nearly caught her up, and the Sirius reached New York only a few hours ahead. The journey had taken the Sirius seventeen days, and the Great Western only fourteen, instead of the month which a sailing ship required.

The steamboat was now a success. There was a long fight between rival sides to get the screw propeller used for driving ships instead of the old wheels at the sides called paddle-wheels, but in the end the screw won for all but smooth

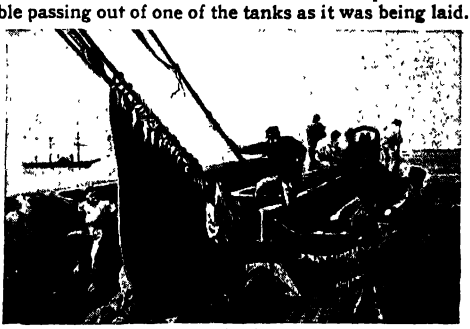
LAYING A CABLE UNDER THE SEA



No ship but the Great Eastern could have carried the 2,300 miles of covered wire required for the Atlantic cable. It was stored in three enormous tanks, which were afterwards filled with water to keep the cable from getting too hot or too cold. Here we see the cable passing out of one of the tanks as it was being laid.



The first cable laid by the Great Eastern broke, and had to be grappled for five miles under the sea. When found, a buoy was let down to mark the spot.



The lost cable was found by dragging over the bottom of the ocean with a large iron with hooks. Here we see the men preparing to lower the grappling-iron.



It was only after many failures that the lost cable was found. There was much anxiety as the end was hauled up from the bottom of the sea, but just as it came into sight it slipped away, and all the work of grappling had to be done over again. Here we see the scene when at last the cable was brought on board.

waters. Similar doubt had to be overcome before the iron ship was built to take the place of wood. Still later there has come another change in the method of driving the ship. The new plan is called the steam-turbine. Many people had tried to perfect an engine on these lines, but Charles A. Parsons, a very clever Englishman, has been most successful. With his new method of driving a vessel we have bigger steamers than ever. The biggest in the world are over 950 feet in length, and carry over 3,000 people at the rate of almost thirty miles an hour.

HOW THE STEAMSHIP LED TO THE INTRODUCTION OF THE OCEAN TELEGRAPH

The faster and farther we ourselves travel, the faster must our messages go. Therefore, when steamships began to cross the ocean, men began to wish for a method whereby news could travel still more rapidly across the waters. We read on page 2161 how men discovered electricity, and we see how the way was prepared for the telegraph cable which runs under the sea. All we need do here is shortly to recall the trials of the man who laid the first cable under the Atlantic, enabling us to have immediate communication with England. The man was Sir Charles Tilston Bright, who gained his great triumph when he was only twenty-six—the same age at which Mr. Marconi, years and years afterwards, sent his first message across the sea without the help of telegraph wires.

Other men, before Bright, tried to solve the problem. Sir William O'Shaughnessy Brooke succeeded in 1838 in sending messages over a wire which passed through a river in India. Professor Samuel Morse, who gave America her telegraph, and whose system of signals for telegrams is everywhere used, sent messages through a copper wire laid in the water of New York Harbor. It was a great feat, but he was terribly poor at the time. "I am crushed for want of means," he wrote. "My stockings all want to see my mother, and my hat is hoary with age."

THE FIRST TELEGRAPH WIRES THAT RAN FROM LAND OUT TO A SHIP AT SEA

Next an American, named Ezra Cornell, got a cable to work through twelve miles of water. That was in 1845. The cable worked well for some months, but was then broken by ice. Cornell deserves to be remembered as the man who founded the famous Cornell University in America. In 1846 an Englishman named Charles West tried to lay a line from England to France. He got as far as Portsmouth Harbor, where, holding the end of his cable in a boat, he sent messages by it to the shore. Poverty prevented him from carrying out his scheme.

The first real success was a curious one. The cable was laid for two miles in the waters of the English Channel, in January, 1849, then brought to land at Folkestone and joined to a wire on land 83 miles long, but it carried messages to London, and back to the ship at sea which held the end of the cable.

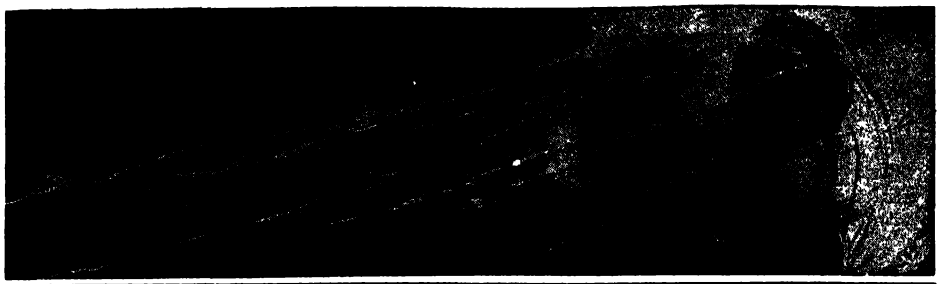
Many minds in England and America were now fixed on the idea. In America Cyrus West Field, who had made a fortune as a paper manufacturer, but died a poor man, was doing all he could to promote schemes for a cable from America to England; in Great Britain Jacob and John Watkins Brett, two brothers, were trying to get the Government's permission to start a cable between England and France. After much annoying delay they got a cable fixed from Dover to Calais, entirely at their own expense.

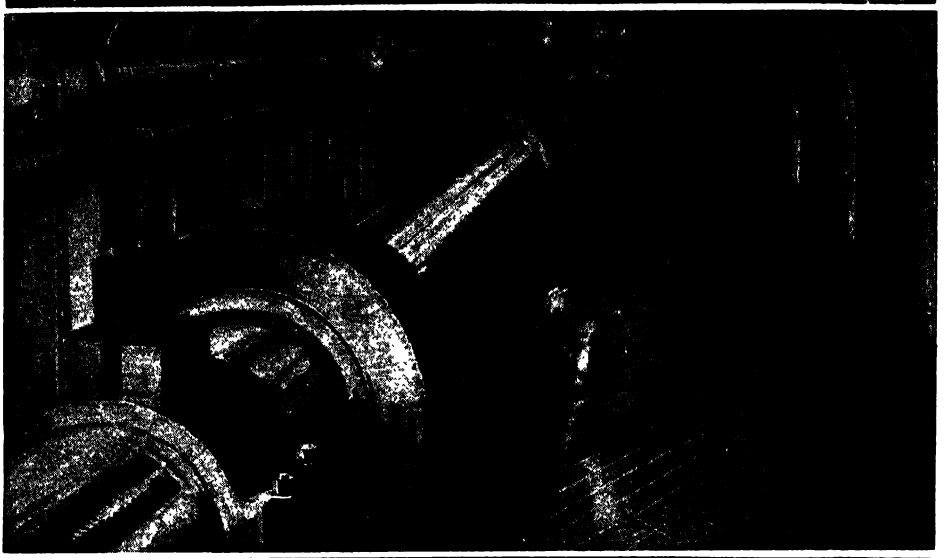
THE FISHERMAN WHO DRAGGED UP A CABLE IN HIS NET

The ship with the cable started in August, 1850, and the wire was soon landed at Calais. Messages were sent over it by Queen Victoria and the Emperor Napoleon III., but then the cable suddenly snapped; an ignorant fisherman had dragged it up with his nets and broken it in the belief that it was a new kind of seaweed! Still, the wire had served its purpose by showing what it could do. A new one was soon laid, and others linking other places followed.

People had by this time ceased to regard the cables as seaweed, or to believe that to make signals they had to pull at the cables like bell-wires. So now there was a serious proposal to lay a cable through the Atlantic, and the man chosen for the work was young Charles Tilston Bright. Of course, the wise men said that the thing could not be done. Sir George Airy, whom we have met on page 1662, was one of the most

HOW A TURBINE DRIVES THE SHIP







This turbine engine has a power equal to the strength of 20,000 horses. The bottom picture shows the case in which are concealed the steam driver blades which turn the long shaft that in its turn drives the propeller through the water, as seen in the top picture, and moves the great ship forward through the waves.

confident of the opponents. It was impossible, he said, to sink a cable to the bottom of the deep sea, and, if it were possible, such a cable would not convey signals. Well, the Bretts met Cyrus Field, who went over to England, and they formed a company and instructed Charles Tilston Bright to carry out the work of joining Britain to America by telegraph beneath the ocean.

Bright was a very young man, but he had a wise head. Born in 1832, he was to have gone to Oxford University had not his father lost most of his money. As it was, he had to earn his living, and at nineteen was already doing splendid work in establishing the telegraph system in England. Soon afterwards he laid a cable between England and Ireland. Thus he was well prepared for his work in the Atlantic.

HOW THE CABLE SNAPPED IN MID-OCEAN AND LAY BROKEN UNDER THE SEA

It was on August 5, 1857, that one end of the cable was brought ashore near Valentia, Ireland. The next day the expedition set off. The British Government had supplied two ships and the American Government had supplied two. The cable had to be dropped overboard as the ships traveled to sea.

After a bad start, the ships got 380 miles out, when the cable suddenly snapped, and the two ships had to return to Plymouth leaving the broken cable at the bottom of the sea. It was necessary to raise more money to buy 900 miles of extra cable—a terrible expense. The money was found and the cable bought, and in June, 1858, the ships started off again. When they got out into the Atlantic, they encountered a frightful storm, which lasted a week. Nearly everything in the ship on which Bright sailed was smashed. Many men were injured, and the ship was so badly strained that again and again she almost sank and lost the precious 250 tons of cable which she carried. This time the ships started by laying the cable from mid-ocean, one going towards Newfoundland and the other towards Ireland. But repeatedly the cable broke, owing to the bad workmanship of those who had made it.

HOW A QUEEN'S MESSAGE FLASHED ALONG A WIRE FROM ENGLAND TO AMERICA

The second voyage was a failure, and blank despair reigned in England. However, a few steadfast friends bore up under the blow. They got more money and sent out another cable. Again the ships carrying the two halves of the cable parted in mid-ocean, and this time each arrived at its destination carrying the land-end of the cable with it. Thus one half was drawn up on dry land at Valentia, where the first expedition had started, and the other was landed at White Strand Bay, Newfoundland. The Englishmen who had found the money on their side of the ocean cabled to their friends who had found money in America, expressing their joy at the outcome of their labours.

Then the first public message was sent from Queen Victoria to the President of the United States. The cable lasted long enough to prove that messages could be sent by electricity under 2,000 miles of sea. In all 271 messages were sent; then, after two months, the cable ceased to work.

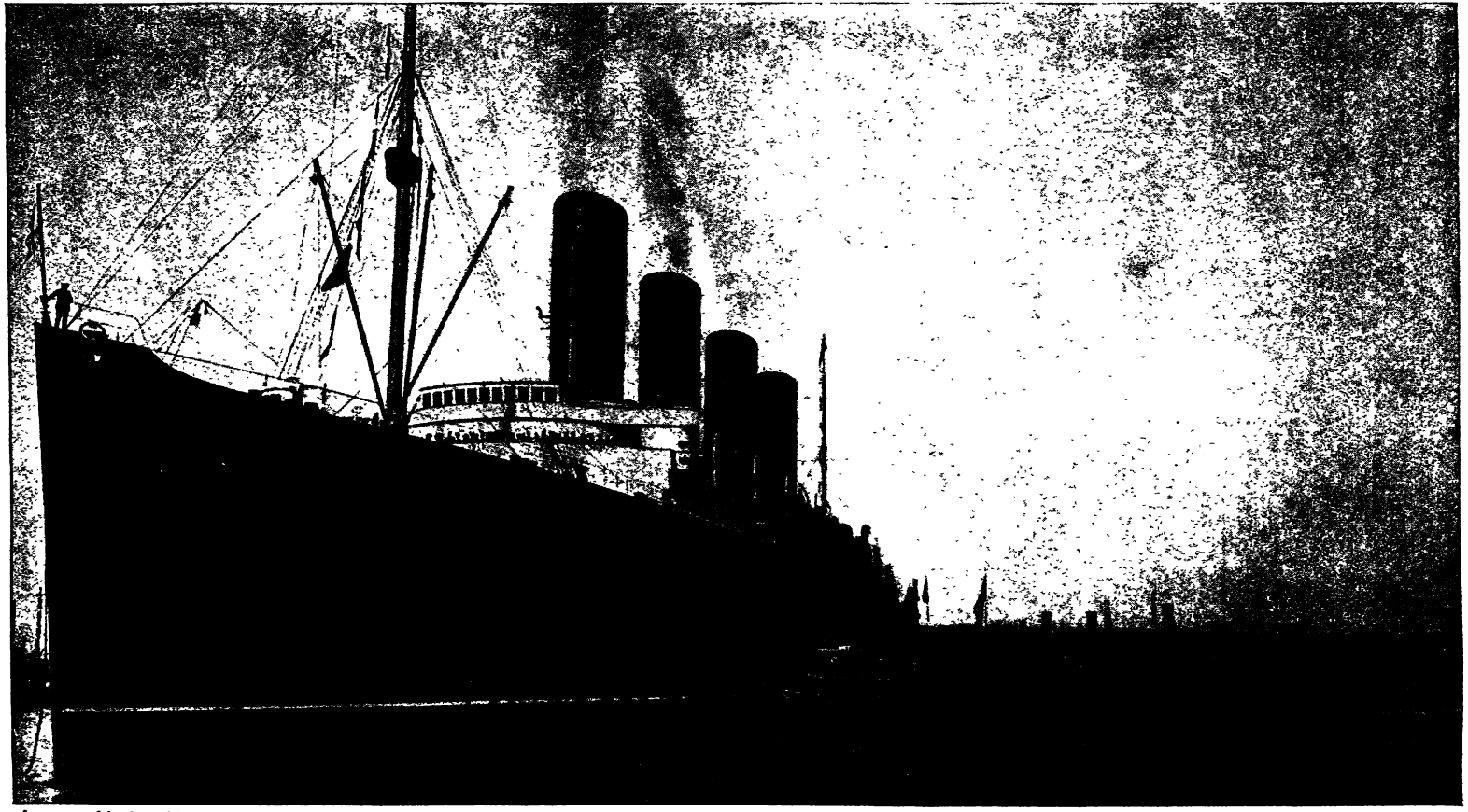
It was too weak, and there were many faults in it. This latest failure was very disheartening, but the great idea, now proved possible, could not be lost. During the next two years a new company was formed, and in 1865 the Great Eastern, the greatest ship built up to that time, set sail with yet another cable. This time a much stouter cable was employed. It was 2,300 miles in length and weighed many tons. But again trouble followed, for the cable broke.

THE CABLES THAT CARRY MESSAGES ALONG THE BEDS OF ALL THE OCEANS

Still another cable was sent out, and this was finally got across, Ireland and Newfoundland being connected by it on July 27, 1866. In the following year the cable 1,100 miles long lost by the Great Eastern in the preceding year was found, and, a fresh section having been added, a second cable to Newfoundland was completed.

Sir Samuel Canning had charge of the engineering work in the Great Eastern cable-laying, but Sir Charles Bright was the company's adviser, and we may in a way regard him as the father of Atlantic cables. He did other great work in this cable-laying, and before he died, in 1881, he saw all the principal oceans lined with cables to carry news to the various points of the compass as fast as thought can travel.

THE SAUCY BUT USEFUL TUGS OF THE HARBOR



A great ship is seldom allowed to go in or out of the slip under its own power. It can neither start, turn nor stop quickly enough, and would smash everything which came in the way. Smart little tugs pull and push until the ship is either safe in the slip or is out in open water. This is the Lusitania in New York, shortly before the trip upon which it was sunk by German torpedoes, off the coast of Ireland. It seems impossible that the tiny tugs should be able to move such a mass.

The cable layers and the men who built the steamships were the men who bridged the seas for us. Since their time, the great Italian, Marconi, has succeeded in inventing a way to send messages through the air—over the sea, instead of under it. We read of his life elsewhere, but we must think of him here, for by reason of his great invention those who travel on the ships, that plough through the deep waters of the sea, need no longer be cut off by silence from their friends.

In these later days, what are called internal combustion engines are used in large numbers of small sea-going boats, and even in vessels large enough to cross the ocean. These engines need no boilers to make steam, and no furnaces in which heat can be created, and of course need much less space than steam engines. It is a little difficult to describe their working because they burn their fuel within their own mechanism, but it is not difficult to understand if we remember that they work on much the same principle as the engines of the launches and motor cars, with which we are so familiar.

THE MAN WHO INVENTED THE DIESEL ENGINE

Gasoline, however, is much too expensive to use in the powerful engines required to move some of the larger ships, and in these ships engines are used, called Diesel engines, which will burn cheap, heavy oil. In some of these engines, changes have been made, and then they are called semi-Diesel engines. Diesel engines are named from their inventor, Rudolf Diesel, a German, who was born in Paris in 1867, and was partly educated in England and partly in Munich. He hoped that his engine would be adopted on most of the large ocean-going ships, and though this has not yet been done, the day may come when steam-driven vessels will be a thing of the past, and oil-burning engines, or electricity generated by them, will drive all our ships.

Even now, oil is used to make steam for many ships. Some of the battleships that guard our coasts from attack by any enemy, burn oil in their furnaces; the tank ships which carry oil from the oil wells of the United States and Mexico to Europe burn up their own freight. These large vessels are steamships, and the oil is broken, by the force of steam, into spray, so that it will burn in furnaces underneath the boilers.

Diesel is the last of the men whom we can name among the conquerors of the sea, but we must remember that many are forgotten, or little known, who are worthy of remembrance on this roll of honor.

FORGOTTEN CONQUERORS OF THE SEA

The men who invented the self-righting lifeboat, and the curious air-filled life-rafts, which some of us have seen and wondered at on board a large vessel, well deserve to be termed conquerors of the sea. Many lives have been saved by the use of these wonderful boats and rafts, that in times of shipwreck, and of warfare, would otherwise have been lost.

Then, too, we ought to remember the builders of the sturdy sea-going tugs which one writer says will tow anything that will float, from any one seaport to any other.

If a steamship goes aground in a storm or fog, tugs rush to the place to pull her off, or to rescue the passengers and crew, and if possible save the cargo. Many a good ship, especially on the stormy rock-bound coast of the Pacific, has owed her life, and the safety of all on board, to the work of the tug boats, whose first inventor no one remembers.

THE LONG VOYAGES MADE BY TUGS

Tugs sometimes go on long voyages. For instance, the Dewey dock, which was built in Maryland, was taken by tugs all the way around South America, by way of the Straits of Magellan to the Philipine Islands, and another large floating dry dock was towed from the River Tyne in Scotland to Callao in Peru by two large tugs.

The conquest of the sea was begun by the first man who found that he could float in the water on a log, and paddle himself along with the aid of a broken bough, and the man who invented a skin boat and learned to make a paddle to push it through the water made a long step forward. Our beautiful canoes, row-boats and launches, our staunch fishing boats and graceful yachts, the freight boats that carry thousands of tons of merchandise, the spacious ocean liners, little torpedo boats and giant warships and their inventors and builders are all descended from that first crude little boat, and its savage maker in the far off primitive days.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 2619.

WHAT THIS STORY TELLS US

ALL of you have eaten maple sugar, and all of you know how good the syrup is, but very few, probably, have seen them made. In this article you are told something of the Sugar Maple, which furnishes us with these delicious sweets, and how they are made. Maple sugar is made only in North America, and most of it is made in Quebec and Ontario in Canada, and in Vermont, New York, Pennsylvania, Ohio and New Hampshire in the United States. Smaller amounts are made in other provinces and states, but those named above furnish most. The joys of the old-fashioned sugar-camp are so described as to make every boy or girl wish to be present at a "sugaring-off," in an old-time camp.

THE MAPLE TREE

CONTINUED FROM 2278

THE Rock or Sugar Maple (Acer saccharum), which combines beauty with utility, is dear to the heart of every Canadian. This is the tree which produces the maple sugar of commerce. The Indians knew all about the sweetness of the maple sap, and though it is doubtful whether they were able to make maple sugar before the coming of the Europeans, they quickly learned the lesson from their white neighbors. During the latter half of the seventeenth century the making of maple sugar was an established industry among them. But of this industry I shall write later.

Unquestionably the sugar maple ranks among the finest of Canadian forest trees. When young, its full, leafy head is often a pure oval. In the forest it frequently rises seventy feet without a branch, and spreads its leaves to the sunlight one hundred and twenty feet above its base. It grows rapidly and is a favorite shade tree. In open situations it develops at a height of eight or ten feet. Stout upright branches form, while the tree is young, a narrow egg-shaped heart, but they ultimately spread into a broad round-topped dome, often eighty feet across, with slender branchlets, which are green at first but become reddish-brown by the end of the first season of their growth.

The winter buds are acute, about one-fourth inch long, with purple outer scales, and inner scales of bright canary-yellow. The bark of the young stems and of large branches is pale, smooth or slightly fissured. It becomes on large trunks one-half to three-fourths of an inch thick, and is broken into deep longitudinal furrows, the light gray-brown surface separating into small gray-brown scales.

The wood is heavy, hard, strong, close-grained, tough, light-brown tinged with red, with a thin sap-wood of from thirty to forty layers of annual growth, and a heartwood of from two to three feet in diameter in old trees. It is capable of a fine polish and is much used for the interior finish of buildings, especially for floors, in the manufacture of furniture and tools, and in shipbuilding. As a fuel it has a high value. By our forefathers it was much used for that purpose, and even now thousands of cords of maple wood are used yearly in the eastern provinces of Canada to supply warmth to the habitants. The ashes of the wood are rich in alkali and yield large quantities of potash. Accidental forms of the wood, with the grain curled and contorted, and known as curly maple and bird's-eye maple, are common, and are highly prized by cabinet makers, especially for use in fine furniture.

THE SONG OF THE MAPLE LEAF

The maple leaf has been adopted as the emblem of Canada and its praises

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are sung in song and story. The conventional maple leaf resembles more the leaf of the red or soft maple (Acer rubrum), but it is the rock maple of which Canadians think when they sing the praises of the maple:

"The maple leaf, our emblem dear,
The maple leaf forever!
God save our King, and Heaven bless
The Maple Leaf forever.

"Oh! the land of the Maple is the land for me,
The home of the stalwart, the brave and the free,
The Rose and the Thistle, the Shamrock and Lis,
All bloom in one garden 'neath the Maple tree."

The foliage is deep green in summer. The leaf is a glossy dark green above and paler beneath. It has five main lobes, the two nearest the stem being smaller, and the curved edges between the lobes are marked with a few smoothly cut large teeth. The main veins extend directly from the petiole to the sharp tips of the lobes. The width of the blade is from three to five inches, and the length the same. The petiole is long, slender, and occasionally red. The leaves are placed opposite. The shade made by the foliage of the maple is so dense that it permits only shade-loving plants to grow beneath it. Even grass grows but sparsely there.

THE GLORY OF THE MAPLE IN THE AUTUMN WOODS

It is the autumn transfiguration which has made people observe the beauty of the maple tree. Yellow, orange, crimson and scarlet foliage make these trees gorgeous when October comes, and they sometimes stand out in the autumn woods like tongues of flames. Even in September they will sometimes show a scarlet branch in the midst of green foliage. After the vivid color is on the maple it begins to shed its leaves; and when the leaves finally fall they form a mulch-carpet for the tree that bore them, thus adding humus from which new powers for growth are drawn. The flowers of the sugar maple appear with the leaves in May as tassel-like, nearly sessile (set close to the branch) clusters from terminal and lateral buds. The flowers are greenish-yellow, and those that bear pollen and those that bear the seeds may be borne on separate trees or on the same tree, but they are always in different clusters. If they are on the same tree the seed-bearing tassels are at the tips of the twigs and those bearing pollen are along the sides. Each downy drooping thread of a tassel bears at its tip a five-lobed calyx, which may hold seven or eight long drooping stamens, or a pistil with long double stigmas. The ovary is two-celled, but there is usually only one seed developed in the pair, which forms a "key." The fruit or "key" has brown, thin, divergent wings which are about one inch long. This twin-winged form is well fitted to be whirled off by the autumn winds, for the seeds ripen in September.

DISTRIBUTION OF THE MAPLE TREE IN CANADA

Maple trees bear blossoms and seeds every year. The rock or sugar maple is found in rich woods, and cool rocky slopes, and is common from Nova Scotia to Manitoba. It has a long list of virtues and its long life, noble proportions, beautiful foliage, dense shade, moderately rapid growth, usual freedom from disease or insect disfigurement, and its adaptability to almost any soil which is not too wet, make it a favorite in cultivation. It transplants easily, recovers its vigor quickly, and grows uniformly. Many of our country roads and town streets are lined by maples which are monuments to the foresight and industry and love for the beautiful in those who planted them; and from many hillsides and groves the rich green of summer and gorgeous tints of autumn maple leaves lend beauty to the landscape.

"It stands beside the cottage door,
Canada's Maple tree;
Its waving branches shade us o'er—
The emblem of the free!
In memory bright that Maple stands,
And in our dreams Canadian hands
We clasp in ever-during bands,
Beneath the Maple tree."

At no season of the year is the maple more popular than in the early days of spring. Then is the tree's yearly festival, the eagerly-looked-forward-to by old and young—the time when maple sugar is made.

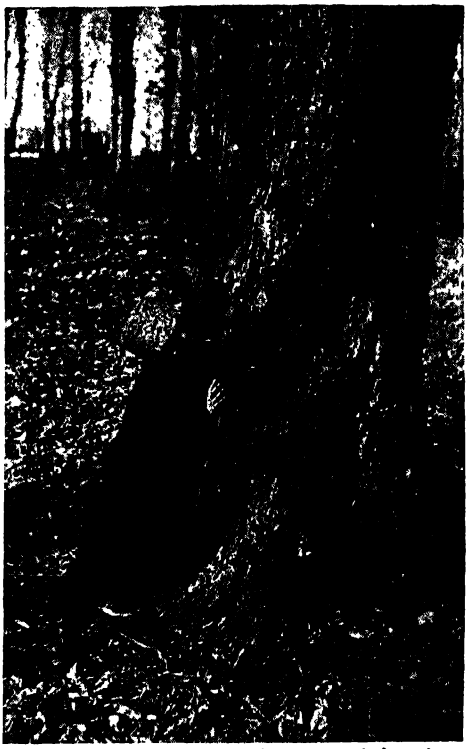
HOW NATURE, THE WONDERFUL CHEMIST, WORKS

The starch which is changed to sugar in the sap of early spring was made the previous season and stored within the

CATCHING THE JUICE OF THE MAPLE-TREE



In America a great deal of the sugar used comes from a tree called the sugar-maple. Maple sugar is not used in England. A hole is bored in the trunk.



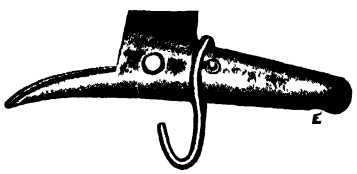
The sweet sap oozes from the tree, and American boys are fond of inserting a tube in the hole that has been bored and sucking the syrup from the tree.



The trees are tapped in time to catch the sap, which rises towards the end of the winter, and pails are hung on the trunks to receive the liquid. A single maple-tree yields from three to six pounds of sugar in a year.

tree. If the foliage of the tree is injured by caterpillars one year, very little sugar can be made from that tree the next spring, because it has been unable to store enough starch in its sap-wood and its smaller branches to make a good supply of sugar. During the latter part of winter the stored starch disappears, being converted into tree-food in the sap.

Then begins that wonderful surging up and down of the sap tide, and city trees that have been carelessly pruned often shower a rain of sweet sap on the streets below them. During the first part of a typical sugar season more sap comes from above than from below, but toward



Metal spile, with hook to hold the covered bucket. The end marked E is driven into the tree.

the end of the season, during poor sap days, there is more sap coming up from below than down from above. The ideal sugar weather consists of warm, bright, sunny days and freezing nights. During the day, when the branches of the tree are warmed by the sun, the pressure forces into the hole bored in the trunk all the sap which has found its way into the adjacent cells of the wood. Then the suction which follows a freezing night drives more sap into those cells, which is in turn forced out when the top of the tree is again warmed. The tree is usually tapped on the south side, where the sun shines longest and its action is greatest.

How maple sugar was made in the early days

Like all industries, maple sugar-making, which is peculiarly an American industry, has changed greatly within recent years. Until about fifty years ago maple sugar and maple honey were home-made and home-consumed. Cane sugar was hard to obtain and very dear, and little was used in rural homes. Each farm pantry had its barrels of cakes of maple sugar and its many gallons of maple honey. The sugar was broken into bits and used for sweetening the tea, and the cake in cooking; and "bread and honey" made the children happy.

The practices of the early settlers were not much in advance of those employed by the Indians, who, by dropping hot stones into the sap, or by freezing it repeatedly, drove off the water and obtained honey. "Tapping the sugar-bush," even in these days, are magical words to the country boy or girl in the eastern part of Canada. In pioneer days the "tapping" consisted of an unsightly slash on the tree trunk made by two cuts with an axe. The receptacle for holding the sap consisted of a trough burned out or cut out of a soft-wood log, and the sap was conveyed to the trough by means of a furrowed piece of wood or a bent piece of tin driven into the bark below the cut in the tree. These gave place to spiles of cedar or sumach driven into a hole bored into the tree with an auger, and to buckets made of staves.

Old ways pass away and new ones come

Now in their turn the picturesque old stave bucket and cedar spile are gone, and in their place the patent galvanized iron spile shown on this page not only conducts the sap, but holds in place a tin bucket carefully covered, as you see



Metal bucket to catch the sap.

in the picture, to prevent the entrance of dirt. Well do we remember those days in March or early April when father would say: "It is time to wash the sap-buckets, for we shall soon tap the sugar-bush." With buckets and spiles ready, when the long-wished-for day came, the large sap-cask (a discarded molasses cask), the large iron cauldron-kettle, buckets, spiles, chains, axes, and various other utensils, and as many children as could find standing room, were loaded on the drag or sled, and the procession started for the maple woods.

Boys and girls at work and play in the sugar-bush

The men with augers bored holes in certain trees near other holes which had

HOW THE MAPLE-SUGAR IS MADE



It is a strange sight to see hundreds of trees with buckets hanging upon them, and to watch men going round collecting the sap that has dripped into the pails. From two to four holes are bored in each tree. As soon as the tree begins to bud, the sap ceases to flow, and the sugar-collecting stops until the following spring.



To transform the sap into sugar is a very simple process, owing to the absence of impurities in the fluid. It is boiled in pans over a wood fire, in many cases in the open air. The scum is removed as it rises, and when the sugar crystalizes it is allowed to cool. About 5,000 tons of maple-sugar are produced each year in America.

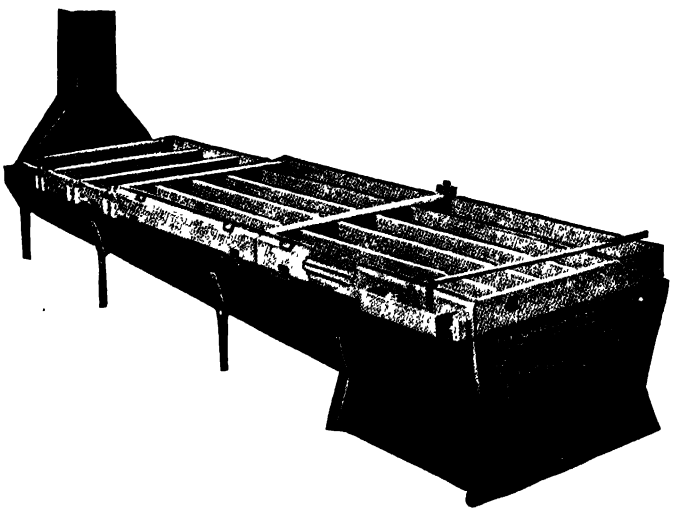
bled sweet juices in years gone by. When the auger was withdrawn the sap followed it, and many a young tongue had a lick or two of the sweet sap before the spile was driven in with a wooden mallet. Next day, and each following day, the sap was gathered in the sap-cask (hogshead) and conveyed to the camp or "boiling" place, where the large iron kettle, suspended from a log, held at each end by upright forked stakes, and flanked with two great logs against which the fire was to be kindled, was ready to receive it. Then came the best time of all, the "sugaring-off."

As the evening shades gathered, the delicious odor of the steam from the boiling sap permeated the woods farther than the shafts of firelight could pierce the gloom. How weird and delightful was this night experience in the woods! And how cheerfully we swallowed the smoke which the contrary wind seemed always to send into our faces! We poked the fire for the pleasure of seeing the sparks fly upward, and now and then added more sap from a barrel, and removed the scum from the boiling liquid with a skimmer thrust into the cleft of a long stick for a handle.

As it grew later we drew closer to each other round the fire, while we told stories learned from our grandfathers of the Indians, bears, panthers and wolves which had one time roamed through those very woods. Then there came to each a disquieting suspicion that perhaps they were not all gone even then, for everything seemed possible in those night-shrouded woods; and our hearts suddenly "jumped into our throats" when near by there sounded the tremendous, blood-curdling cry of a screech-owl.

SUGARING-OFF IN THE FIRE-LIT CAMP

After much boiling, the odor grew more and more delicious, and presently the syrup was pronounced sufficiently thick, but not before we had thrown into it a thin slice of fat pork, to prevent, by its mysterious calming influence, the syrup from boiling over. The kettle was swung off the fire, the syrup strained through a cloth strainer, and jars were filled with the clear amber-colored honey. If the hour had not grown too late, part of the honey was further boiled until it became very thick. Then that most longed-for event, the "sugaring-off," took place. The hot, thick syrup was poured in thin layers on hardened snow to make that most delicious of all sweets, maple-candy; or the syrup was stirred until it "grained," and was then poured into tins to make the "cakes" of maple sugar.



A modern evaporating vat, by which the sap is turned into syrup.

Then came the home-going through the moonlight, or the dim, mysterious darkness of the starlight, when the songs and laughter of our merry bands echoed down the dark aisles of the leafless trees, startling the wild denizens of the woods, and sending them crashing through the underbrush.

In another volume of THE BOOK OF

KNOWLEDGE you are told how the different kinds of sugar are made, and on pages 2501 and 2503 you will find pictures of the old methods of making maple syrup and sugar which have just been described. Such scenes might have been seen on many farms in Canada and in the United States, only a few years ago.

pleasure in the simple joys of sugar making. The wooden spile, and trough, or wooden bucket, are now relics of the past. The iron kettle lies rusting in the shed. In its place, in carefully built sugar-houses, are evaporating-vats, set over furnaces with chimneys. To those who midst smoke and cinders brewed



This picture shows a picnic party at a modern sugar camp. Notice the metal buckets on the trees, into which the sap is dripping, and the tank drawn by horses, into which the buckets are emptied when full. The tank is then brought to the house, where some of the water in the sap is carefully evaporated, and we have maple syrup. Further boiling produces maple sugar. The modern evaporator is shown on a previous page, and the old-time method on page 2503.

Of course such methods could not continue, for in these days many men are devoting all their thought to finding easier and cheaper ways of doing everything. Just as the old-fashioned scythe had to give way to the mowing machine, and the hand rake to the rake drawn by a horse, so the old methods of making maple sugar gave way to the new which have been shown you in the pictures in the present article.

No longer does the old-time camp fire throw its dancing shadows on the dark tree trunks, while the woods resound to the shouts and songs and the merry laughter of a youthful band who found the rich honey of days gone by, the pale and anaemic maple syrup of to-day lacks much in flavor and richness.

"Do you say that sugar-making
Is not all a pleasure-taking,
When by rain and slush beset
Rubber boots get soaking wet,—
And still the sap runs on like mad
And must be gathered, good or bad,
And then an all night's vigil keep
To toil and boil, while others sleep."

"If so be that there are woes,
Let them be portrayed in prose,
But the muses gladly sing
The delights of sugaring,
And the wonder of the juices
That our Mother Earth produces."

THE NEXT STORY OF CANADA IS ON PAGE 2575.

The National Anthem of Canada

THE MAPLE LEAF FOREVER

IN days of yore, from Britain's shore
Wolfe, the dauntless hero, came,
And planted firm Britannia's flag
On Canada's fair domain.
Here may it wave, our boast, our pride,
And joined in love together,
The Thistle, Shamrock, Rose entwine
The Maple Leaf forever!

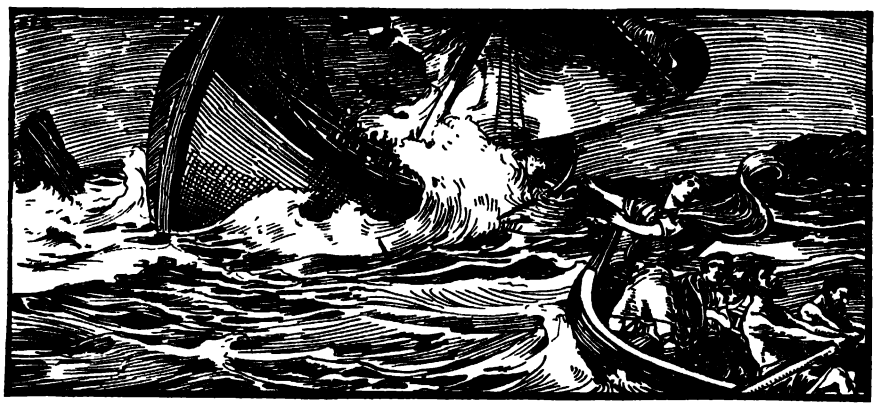
The Maple Leaf, our emblem dear,
The Maple Leaf forever!
God save our King and Heaven bless
The Maple Leaf forever!

At Queenston's Heights and Lundy's Lane,
Our brave fathers, side by side,
For freedom, homes, and loved ones dear,
Firmly stood and nobly died;
And those dear rights which they maintained,
We swear to yield them never!
Our watchword evermore shall be,
The Maple Leaf forever!

Our fair Dominion now extends
From Cape Race to Nootka Sound;
May peace forever be our lot,
And plenteous store abound:
And may those ties of love be ours
Which discord cannot sever,
And flourish green o'er Freedom's home,
The Maple Leaf forever!

On Merry England's far-famed land
May kind Heaven sweetly smile;
God bless Old Scotland evermore,
And Ireland's Emerald Isle!
Then swell the song both loud and long,
Till rocks and forests quiver,
God save our King, and Heaven bless
The Maple Leaf forever!

— ALEXANDER MUIR.



WHEN THE WHITE SHIP WENT DOWN

CONTINUED FROM 2446

WE do not know very much about Prince William, the only son of Henry I., except that his father was very fond of him and that he very much disliked the people of Normandy, which his father had conquered. But there is one deed of his which we like to recall, because it shows he could think of another's safety before his own, and by it he lost his life at the age of eighteen.

Prince William's father was constantly at war with the French king, who resented the presence of the English in Normandy, and especially of King Henry, who had unjustly taken it from his brother Robert and his son.

In 1120 Henry made peace with the King of France, and set sail from Barfleur, in Normandy, on his return to England. The wind was favorable, and the vessel was soon out of sight of land. Prince William and his courtiers were not ready to start with the king, and it was not until nightfall that they left the port, for the stupid courtiers gave wine to the sailors, and then the rowers were not in a fit condition to take the boat safely across the Channel. It was called the Blanche Nef, or White Ship, and was commanded by the same man who had rowed Prince William's grandfather across to the conquest of England 54 years before.

Some of the sensible people refused to trust themselves to the incapable sailors, and those who remained in the boat soon repented doing so. There was no moon, and the man who was steering drove the vessel on to one of the dangerous rocks near Alderney. There were nearly 300 people on board, and they managed to lower a boat, and put Prince William with a few others into it. Then the prince remembered his half-sister, and ordered the little boat to return to rescue her. But directly the small boat got alongside the ship, the frantic people jumped into it, and, of course, the boat was sunk.

It is said that only two men got away from the wreck. One was the captain, who afterwards drowned himself when he knew the prince was lost; the other was a butcher of Rouen, who clung on to the mast, and was picked up by a fishing boat next day. It was he who told the news of the wreck and the way Prince William lost his life, and how 140 young men belonging to noble families had died.

Not one of the courtiers dared to tell the king the fate of his only son, in whom all his hopes centred, but at last the nobles sent a weeping page to him with the tidings that the White Ship was lost, and all had perished. It is said that King Henry fainted, and was never seen to smile again.

BRAVE COUNTESS JOAN OF BRITTANY

ACROSS the English Channel, in the far north-west of France, is Brittany, where the people are kinsmen of the Cornish and the Welsh, and the English kings longed for the possession of this country in the Middle Ages.

Now, it happened that a Duke of Brittany died, leaving no child to succeed him, and a dispute arose between Charles, Count of Blois, who had married the daughter of the duke's next brother, and John, Count of Montfort, the youngest brother.

Edward III. of England took the side of John of Montfort, and the French that of the Count of Blois. The French captured Nantes, where John of Montfort was, and the King of France kept him a close prisoner in the Louvre.

But John of Montfort had a brave wife, Joan, who never dreamed of giving way to her misfortunes. She summoned the inhabitants of Rennes before the castle where she lived, and, presenting to them her little son, appealed to them to rise and defend the last male heir of their ancient line of dukes. The English, she said, would surely come before long to the help of a brave people.



Presenting her little son to the people, the countess appealed to them to rise and defend the heir of their ancient line of dukes.

Her appeal to the Bretons was not in vain, and the men rallied round the countess, who then visited other towns and arranged for their defence, proving herself a skilful leader and most able general. Sending her little son over to England for safety, she then returned to Hennebont, near the coast, there to await succour from England.

The Count of Blois thought he could soon conquer a duchy defended by a woman, and so he gathered an army, captured Rennes, and besieged Hennebont.

The countess put on a suit of armor mounted a war-horse, and was ever on the walls where the attack was sharpest, encouraging her men at every point, and directing their defence. Noticing the camp of the besiegers unguarded one day, she led 500 men to it through a postern gate in the walls, and setting fire to the baggage, diverted the attention of the enemy. Then she found herself and her little band cut off from the town, but she galloped away into safety and reached Auray. Five days later she fought her way back into Hennebont. There she found the Bishop of Leon about to surrender the town to her enemy the Count of Blois.

Day after day dawned, night after night passed, but no succor from England came to the despairing town. At last one day, when the bishop was actually discussing the terms of surrender with the Count of Blois, the countess mounted yet once more a high tower and looked towards the sea. Shading her eyes with her hands, she gazed longingly across the water. Were the English ships never coming? Ah, what was that small speck in the distance, and another, and yet another? Eagerly she watched, until now there was no longer any doubt. It was really the English fleet, coming at last to her aid.

Soon after, Sir Walter Manny brought the vessels into the harbour, attacked the camp of the besiegers, and burned it to ashes. A treaty was made by which the Count of Montfort was set free, but he died soon after in one of the frequent encounters. Through it all the English king, Edward, proved a firm friend to the countess, and supported the cause of her little son. Though after a long struggle Brittany became part of France, yet the brave countess upheld her son's rights, so that, when older, he ruled as Duke of Brittany, and was known as John of Montfort.

THE NEXT GOLDEN DEEDS ARE ON PAGE 2665.



KING BRUCE AND THE SPIDER

ELIZA COOK, a busy writer, both of prose and verse, was born in 1818 and died in 1889. She was not in any sense a remarkable poet, and the following verses, chosen for the Book of Poetry, owe their interest as much, indeed more, to the legend they relate than to the manner of its telling. But the poem has a simple vigor and a direct appeal that make it particularly suitable for young people. The story has long been a favorite one to illustrate the wisdom of "try, try, try again," as the well-known proverb in rhyme advises us, "if at first you don't succeed."

CONTINUED FROM 2455

KING BRUCE of Scotland flung himself down
In a lonely mood to think;
'Tis true he was monarch, and wore a crown,
But his heart was beginning to sink.
For he had been trying to do a great deed,
To make his people glad,
He had tried, and tried, but couldn't succeed;
And so he became quite sad.

He flung himself down in low despair,
As grieved as man could be;
And after a while as he pondered there,
"I'll give it all up," said he.

Now just at that moment a spider dropp'd
With its silken cobweb clue;
And the King in the midst of his thinking stopp'd
To see what that spider would do.

'Twas a long way up to the ceiling dome,
And it hung by a rope so fine;
That how it would get to its cobweb home
King Bruce could not divine.

It soon began to cling and crawl
Straight up with strong endeavour;
But down it came with a slippery sprawl,
As near the ground as ever.

Up, up it ran, not a second it stay'd
To utter the least complaint;
Till it fell still lower, and there it laid,
A little dizzy and faint.

Its head grew steady—again it went,
And travell'd a half-yard higher;
'Twas a delicate thread it had to tread,
A road where its feet would tire.

Again it fell and swung below,
But again it quickly mounted,
Till up and down, now fast, now slow,
Nine brave attempts were counted.

"Sure," cried the King, "that foolish thing
Will strive no more to climb;
When it toils so hard to reach and cling,
And tumbles every time."

But up the insect went once more,
Ah, me! 'tis an anxious minute;
He's only a foot from his cobweb door,
Oh, say will he lose or win it!

Steadily, steadily, inch by inch,
Higher and higher he got;
And a bold little run at the very last pinch
Put him into his native cot.

"Bravo, bravo!" the King cried out,
"All honour to those who *try*;
The spider up there defied despair,
He conquer'd, and why shouldn't I?"

And Bruce of Scotland braced his mind,
And gossips tell the tale,
That he tried once more as he tried before,
And that time did not fail.

Pay goodly heed, all ye who read,
And beware of saying, "I *can't*."
'Tis a cowardly word, and apt to lead
To Idleness, Folly, and Want.

Whenever you find your heart despair
Of doing some goodly thing;
Con over this strain, try bravely again,
And remember the Spider and King.

THE THREE FISHERS

In this fine poem by Charles Kingsley the tragic fate that so often awaits our toilers of the sea is described with great dramatic power. We cannot read it without a feeling of sympathy for the fisherfolk, and especially for their womenkind who have to wait with anxious hearts at home when the storm has overtaken their loved ones on the deep.

THREE fishers went sailing away to the West,
Away to the West as the sun went down;
Each thought on the woman who loved him the best,
And the children stood watching them out of the town;
For men must work, and women must weep,
And there's little to earn, and many to keep,
Though the harbour-bar be moaning.

Three wives sat up in the lighthouse tower,
And trimmed the lamps as the sun went down,
And they looked at the squall, and they looked at the shower,
And the night rack came rolling up, ragged and brown;
But men must work, and women must weep,
Though storms be sudden, and waters deep,
And the harbour-bar be moaning.

Three corpses lay out on the shining sands,
In the morning gleam as the tide went down,
And the women are watching and wringing their hands,
For those who will never come home to the town
For men must work, and women must weep,
And the sooner it's over, the sooner to sleep,
And good-bye to the bar and its moaning.

THE LAST CHARGE OF THE FRENCH AT WATERLOO

Sir Walter Scott, the author of the Waverley Novels, is always seen at his best, both in poetry and in prose, where he is picturing in vivid words the excitement of the fray when a battle is at its most critical moment. In these lines we see how alive his verse could be under the inspiration of his subject.

ON came the whirlwind like the last
But fiercest sweep of tempest-blast—
On came the whirlwind—steel-gleams broke
Like lightning through the rolling smoke;
The war was waked anew,
Three hundred cannon-mouths roar'd loud,
And from their throats, with flash and cloud,
Their showers of iron threw.
Beneath their fire, in full career,
Rush'd on the ponderous cuirassier,
The lancer couch'd his ruthless spear,
And hurrying as to havoc near,
The cohorts' eagles flew.
In one dark torrent, broad and strong,
The advancing onset roll'd along,
Forth harbinger'd by fierce acclaim,
That, from the shroud of smoke and flame,
Peal'd wildly the imperial name!

But on the British heart were lost
The terrors of the charging host;
For not an eye the storm that view'd
Changed its proud glance of fortitude,
Nor was one forward footstep stay'd
As dropp'd the dying and the dead
Fast as their ranks the thunders tear,
Fast they renew'd each serried square:
And on the wounded and the slain
Closed their diminish'd files again,
Till from their line scarce spears lengths three,
Emerging from the smoke they see
Helmet, and plume, and panoply—
Then waked their fire at once!
Each musketeer's revolving knell,
As fast, as regularly fell,
As when they practise to display
Their discipline on festal day.
Then down went helm and lance,
Down were the eagle-banners sent,
Down reeling steeds and riders went,
Corslets were pierced, and pennons rent;
And to augment the fray,
Wheel'd full against their staggering flanks,
The English horsemen's foaming ranks
Forced their resistless way.
Then to the musket-knell succeeds
The clash of swords, the neigh of steeds—
As plies the smith his clanging trade,
Against the cuirass rang the blade;
And while amid their close array
The well-served cannon rent their way
And while amid their scatter'd band
Raged the fierce rider's bloody brand,
Recoil'd in common rout and fear
Lancer and guard and cuirassier,
Horsemen and foot,—a mingled host!
Their leaders fall'n, their standards lost.

THE HORSE

To Miss Jane Taylor we owe many pleasant little poems on the most familiar things of everyday life, and six or seven of her pieces have already appeared in these pages. In giving a further example from her pen, it may be remarked that this used to be a favourite piece in the school-books thirty or forty years ago, but its quiet humour and the lesson it teaches still merit for it the attention of the young reader.

A HORSE, long used to bit and bridle,
But always much disposed to idle,
Had often wished that he was able
To steal unnoticed from the stable.

He panted from his inmost soul,
To be at nobody's control,
Go his own pace, slower or faster,
In short, do nothing—like his master.

But yet he ne'er had got at large,
If Jack (who had him in his charge)
Had not, as many have before,
Forgot to shut the stable-door.

Dobbin, with expectation swelling,
Now rose to quit his present dwelling,
But first peeped out with cautious fear,
To examine if the coast were clear

At length he ventured from his station,
And with extreme self-approbation,
As if delivered from a load,
He galloped to the public road

And here he stood awhile debating
(Till he was almost tired of waiting),
Which way he'd please to bend his course,
Now there was nobody to force

At last unchecked by bit or rein,
He sauntered down a pleasant lane,
And neighed forth many a jocund song,
In triumph, as he pass'd along.

But when dark night began t'appear,
In vain he sought some shelter near,
And well he knew he could not bear
To sleep out in the open air

The grass felt very damp and raw,
Much colder than his master's straw;
Yet on it he was forced to stretch
A poor cold, melancholy wretch

The night was dark, the country hilly,
Poor Dobbin felt extremely chilly,
Perhaps a feeling like remorse,
Just then might sting the truant horse.

As soon as day began to dawn,
Dobbin, with long and weary yawn,
Arose from this his sleepless night,
But in low spirits and bad plight.

If this (thought he) is all I get,
A bed unwholesome, cold and wet,
And thus forlorn about to roam,
I think I'd better be at home.

'Twas long ere Dobbin could decide
Betwixt his wishes and his pride,
Whether to live in all this danger,
Or go back sneaking to the manger.

At last his struggling pride gave way;
The thought of savoury oats and hay
To hungry stomach was a reason
Unanswerable at this season.

So off he set with look profound,
Right glad that he was homeward bound;
And, trotting fast as he was able,
Soon gained once more his master's stable.

Now Dobbin after this disaster,
Never again forsook his master,
Convinced he'd better let him mount,
Than travel on his own account.

THE HORNED OWL

In this poem Barry Cornwall, two of whose poems we have already read on pages 715 and 1294 gives us a more sympathetic and friendly description of the bird of night than poets, as a rule, are inclined to devote to the owl. His poem also conveys a thought that is worth thinking over. It reminds us that, although we may be apt to consider the owl a lonely bird, we are wrong in thinking so, for there is a companionship of the night as of the day.

IN the hollow tree in the old grey tower,
The spectral owl doth dwell;
Dull, hated, despised in the sunshine hour;
But at dusk he's abroad and well:
Not a bird of the forest ere mates with him;
All mock him outright by day;
But at night, when the woods grow still and dim
The boldest will shrink away. [fowl,
Oh, when the night falls, and roosts the
Then, then is the reign of the horned owl!

And the owl hath a bride who is fond and bold,
And loveth the wood's deep gloom:
And with eyes like the shine of the moonshine
She awaiteth her ghastly groom! [cold

Not a feather she moves, not a carol she sings,
As she waits in her tree so still:
But when her heart heareth his flapping wings,
She hoots out her welcome shrill! [howl,
Oh, when the moon shines, and dogs do
Then, then is the joy of the horned owl.

Mourn not for the owl nor his gloomy plight!
The owl hath his share of good:
If a prisoner he be in the broad daylight,
He is lord in the dark green wood!
Nor lonely the bird, nor his ghastly mate;
They are each unto each a pride—
Thrice fonder, perhaps, since a strange dark fate
Hath rent them from all beside!
So when the night falls, and dogs do howl,
Sing ho! for the reign of the horned owl!
We know not always who are kings by day,
But the king of the night is the bold brown owl.

ROBERT OF LINCOLN

"Robert of Lincoln" is considered one of the finest bird poems ever written; it is by William Cullen Bryant, the American poet.

MERRILY swinging on brier and weed,
Near to the nest of his little dame,
Over the mountain-side or mead,
Robert of Lincoln is telling his name.
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Snug and safe in this nest of ours,
Hidden among the summer flowers.
Chee, chee, chee.

Robert of Lincoln is gayly dressed,
Wearing a bright, black wedding-coat:
White are his shoulders, and white his crest.
Hear him call in his merry note,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Look what a nice new coat is mine;
Sure there was never a bird so fine.
Chee, chee, chee.

Robert of Lincoln's Quaker wife,
Pretty and quiet with plain brown wings,
Passing at home a patient life,
Broods in the grass while her husband sings,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Brood, kind creature, you need not fear
Thieves and robbers while I am here.
Chee, chee, chee.

Modest and shy as a nun is she;
One weak chirp is her only note;
Braggart, and prince of braggarts is he,
Pouring boasts from his little throat,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Never was I afraid of man,
Catch me, cowardly knaves, if you can.
Chee, chee, chee.

Six white eggs on a bed of hay,
Flecked with purple, a pretty sight:
There as the mother sits all day,
Robert is singing with all his might,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Nice good wife that never goes out,
Keeping house while I frolic about.
Chee, chee, chee.

Soon as the little ones chip the shell,
Six wide mouths are open for food;
Robert of Lincoln bestirs him well,
Gathering seeds for the hungry brood:
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
This new life is likely to be
Hard for a gay young fellow like me.
Chee, chee, chee.

Robert of Lincoln at length is made
Sober with work, and silent with care,
Off is his holiday garment laid,
Half forgotten that merry air,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
Nobody knows but my mate and I,
Where our nest and our nestlings lie,
Chee, chee, chee.

Summer wanes; the children are grown;
Fun and frolic no more he knows,
Robert of Lincoln's a hum-drum drone;
Off he flies, and we sing as he goes,
Bob-o'-link, bob-o'-link,
Spink, spank, spink,
When you can pipe that merry old strain,
Robert of Lincoln, come back again.
Chee, chee, chee.

THE OVERLAND MAIL

This poem by Rudyard Kipling shows us the hero in the man who performs the common everyday services of life, and the subject of the poem is one which every child should know.

IN the name of the Empress of India, make way,
O lords of the jungle wherever you roam,
The woods are astir at the close of the day—
We exiles are waiting for letters from home—
Let the robber retreat, let the tiger turn tail,
In the name of the Empress, the Overland Mail.

With a jingle of bells as the dusk gathers in,
He turns to the footpath that leads up the hill—
The bags on his back, and a cloth round his chin,
And, tucked in his belt, the Post-Office bill—
"Despatched on this date, as received by the rail,
Per runner, two bags of the Overland Mail."

Is the torrent in spate? He must ford it or swim.
Has the rain wrecked the road? He must climb by the cliff
Does the tempest cry "Halt"? What are tempests to him?
The service admits not a "but" or an "if";
While the breath's in his mouth, he must bear without fail,
In the name of the Empress, the Overland Mail.

From aloe to rose-oak, from rose-oak to fir,
From level to upland, from upland to crest,
From rice-field to rock-ridge, from rock-ridge to spur,
Fly the soft-sandalled feet, strains the brawny brown chest,
From rail to ravine—to the peak from the vale—
Up, up through the night goes the Overland Mail.

There's a speck on the hillside, a dot on the road—
A jingle of bells on the foot-path below—
There's a scuffle above in the monkeys abode—
The world is awake, and the clouds are aglow—
For the great sun himself must attend to the trail;
In the name of the Empress, the Overland Mail

MY MARYLAND

This poem was written by James Ryder Randall, a native of the state, when he heard of the skirmish which took place in Baltimore as the Federal troops were passing through. It spread over the whole South, but its appeal was in vain.

THE despot's heel is on thy shore,
Maryland!
His torch is at thy temple door,
Maryland!
Avenge the patriotic gore
That flecked the streets of Baltimore,
And be the battle-queen of yore,
Maryland, my Maryland!

Hark to an exiled son's appeal,
Maryland!
My Mother State, to thee I kneel,
Maryland!
For life and death, for woe and weal,
Thy peerless chivalry reveal,
And gird thy beauteous limbs with steel,
Maryland, my Maryland!

Thou wilt not cower in the dust,
Maryland!
Thy beaming sword shall never rust!
Maryland!
Remember Carroll's sacred trust,
Remember Howard's warlike thrust,
And all thy slumberers with the just,
Maryland, my Maryland!

Come, 'tis the red dawn of the day,
Maryland!
Come with thy panoplied array,
Maryland!
With Ringgold's spirit for the fray,
With Watson's blood at Monterey,
With fearless Lowe and dashing May,
Maryland, my Maryland!

Dear mother, burst the tyrant's chain,
Maryland!
Virginia should not call in vain,
Maryland!
She meets her sisters on the plain—
"Sic semper!" 'tis the proud refrain
That baffles minions back amain,
Maryland, my Maryland!

Come! for thy shield is bright and strong,
Maryland!
Come! for thy dalliance does thee wrong,
Maryland!
Come to thine own heroic throng
Stalking with Liberty along,
And chant thy dauntless slogan-song,
Maryland, my Maryland!

I saw the blush upon thy cheek,
Maryland!
For thou wast ever bravely meet,
Maryland!
But lo! there surges forth a shriek,
From hill to hill, from creek to creek,
Potomac calls to Chesapeake,
Maryland, my Maryland!

Thou wilt not yield the Vandal toll,
Maryland!
Thou wilt not crook to his control,
Maryland!
Better a fire upon thee roll,
Better the shot, the blade, the bowl,
Than crucifixion of the soul,
Maryland, my Maryland!

Dear mother, burst the tyrant's chain,
Maryland!
Virginia should not call in vain,
Maryland!
She meets her sisters on the plain—
"Sic semper!" 'tis the proud refrain
That baffles minions back amain,
Maryland!
Arise in majesty again,
Maryland, my Maryland!

Old Mother Hubbard



Old Mother Hubbard
Went to the cupboard
To get her poor dog a bone ;
But when she got there
The cupboard was bare,
And so the poor dog had none.

She went to the baker's
To buy him some bread,
But when she came back
The poor dog was dead.

She went to the joiner's
To buy him a coffin,
But when she came back
The dog was laughing.





She took a clean dish
To get him some tripe,
But when she came back
He was smoking his pipe.

She went to the fishmonger's
To buy him some fish,
And when she came back
He was licking the dish.

She went to the ale-house
To get him some beer,
But when she came back
The dog sat in a chair.



She went to the tavern
For white wine and red,
But when she came back
The dog stood on his head.

She went to the hatter's
To buy him a hat,
And when she came back
He was feeding the cat.

She went to the barber's
To buy him a wig,
But when she came back
He was dancing a jig.

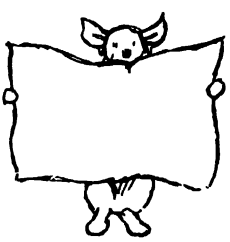




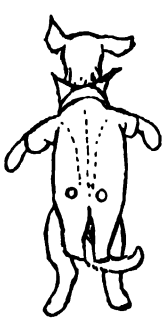
She went to the fruiterer's
To buy him some fruit,
But when she came back
He was playing the flute.

She went to the tailor's
To buy him a coat,
But when she came back
He was riding a goat.

She went to the cobbler's
To buy him some shoes,
But when she came back
He was reading the news.



She went to the sempster's
To buy him some linen,
But when she came back
The dog was spinning.



She went to the hosier's
To buy him some hose,
But when she came back
He was dress'd in his clothes.

The dame made a curtsey,
The dog made a bow;
The dame said, "Your servant,"
The dog said, "Bow-wow!"

DING, DONG, BELL!



JOHNNY shall have a new bonnet,
And Johnny shall go to the fair,
And Johnny shall have a blue ribbon
To tie up his bonnie brown hair.
And why may I not love Johnny?
And why may not Johnny love me?
And why may I not love Johnny,
As well as another body?

And here's a leg for a stocking,
And here's a foot for a shoe,
And he has a kiss for his daddy,
And two for his mammy, I trow.
And why may I not love Johnny?
And why may not Johnny love me?
And why may I not love Johnny,
As well as another body?

KING PIPPIN built a fine new hall,
Pastry and pie-crust were the wall;
Windows made of black pudding and white,
Slates were pancakes, you ne'er saw the like.

SEE-SAW, sacaradown,
Which is the way to London Town?
One foot up, and one foot down,
That is the way to London Town.

ONCE on a time I saw a bear
Who was dressing her daughter's hair.

Once on a time I saw a big rat,
And under his arm he carried his hat.

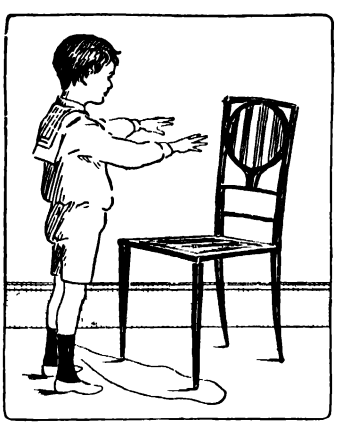


THE CHAIR THAT COMES TO YOU

CONTINUED FROM 2362

ALMOST everybody has heard of mesmerism. If any boy who reads this page has not done so, it may be explained that it means a curious power possessed by some people of making other people obey their commands, even though it be to do something silly or ridiculous.

Such a power as that you are much better without; but we may learn here how to do something which seems to be even more surprizing—namely, how to mesmerize a chair and make it follow you about the room. You seem merely to place yourself in front of it, and wave your hands over it a few times with the same sort of movement that you make in swimming. When you consider the chair sufficiently "mesmerized," you walk backwards, as in the picture, beckoning it to come to you; and it follows you accordingly. At any moment anyone may pick it up and examine it, but he will find nothing to account for its curious behavior.



"Mesmerizing" the chair.

Of course, there is a trick about the matter, and, like many of the best tricks, it is absurdly simple when you know it. It all depends upon a piece of strong black silk thread, not attached to the chair in any way, but arranged in a very ingenious manner.

To prepare for the trick, take the thread, which should be about four feet long, and tie to each end of it a black pin bent into the form of a hook. You then hook one pin into the front of each stocking, if you are wearing knickers, just above the boot. If you wear trousers, the pins must be hooked into the front of each trouser-leg. The rest of the thread will lie on the carpet between your feet, and when you step backwards will form a sort of broad loop in front of you. By gaslight it will be invisible at a few feet distance, and if you are careful it will not interfere in the least with your moving about. The chair used must be of the very light drawing-room kind, and the more upright the legs are the better. If there is more than one such chair in the room, you should let the company decide which of them you shall use.

The choice having been made, you hold the chair upside down, and move it about freely, so as to let people see for themselves that there is nothing attached to it in any way. You then make a step backwards, and set it down facing you, but with one of its legs inside the loop formed by the thread, and begin to make your "mesmeric" passes as already described. You must be very serious over this. After a minute or so you say, "I should think it is now under the mesmeric influence. Chair, come to me!" At first nothing happens, so you mesmerize it a little more, and presently again say, "Chair, it is useless to resist my will. I command you! Come!"

As you say this you make a beckoning movement, and at the same time begin to move very slowly backwards. The drawing back of the foot tightens the thread, and this draws the chair with it.

You should not keep this up too long. When the chair has moved a foot or so, it is best—though still beckoning—to let it come to a standstill. Then you say, "I can't make it come any further. The power is exhausted"—or something to that effect. You then again pick up the chair, free of the thread, and offer it to anybody who cares to examine it.

Simple though it is, this is a trick which requires a good deal of practice before it is performed in public. Not only do you thereby gain confidence, but in the course of your practice you will find out exactly what length of thread suits you best, and the most natural way of drawing back so as to compel the chair to follow you without giving away the secret.

A little powdered French chalk, rubbed beforehand on the end of each leg of the chair, will make it slide easily over the carpet.

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MORE BOX FURNITURE

"DING, dong, ding, dong." Do you hear the school bell ringing? This really is not the school gong, but a musical ding-dong bell to summon the carpenters for the next lesson in Box Furniture. We are going to have a jolly time together with boxes and tools, and will forget when it's time to stop, for this kind of a school is all recess. This time we are going to make three different articles,—a General Utility Box which will be useful in several ways, a Blacking Box which will charm the school boy, and a Wall Rack which will prove very serviceable. Class Attention! Let's begin, for you are all ready with your boxes.

COAL BOX OR GENERAL UTILITY BOX

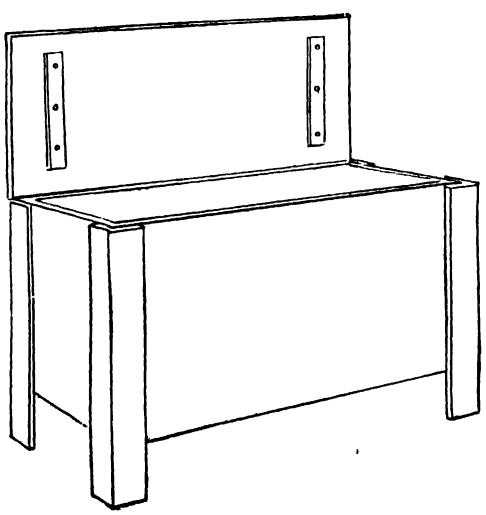
TO the average boy, a coal box may sound rather uninteresting, but to the mother who knows the value of a good-sized box of this character, it means a welcome gift. The charm of the box we are going to describe lies in the fact that it may be used for many different things, for coal, for paper, for odds-and-ends, for storing articles in the garret, when not in use, and last of all for shirt-waists. However, it can hardly be put to all these different uses at the same time. And if Mother claims it for a coal box, don't suggest to your sister that she may have it for a shirt-waist box. If you want this box, for five cents will be all you have to pay the grocer for it. In fact, if you are on the right side of your friend, the grocer, he may be glad to give you the box for a hearty "Thank you." You may also be able to find a box of the necessary size at a hardware or dry-goods shop. Ask for a medium size packing box or soap box, and measure it to see that it is about 12 or 14 inches deep, 16 or 18 inches wide and 27 to 30 inches long. A very satisfactory size is 14 inches deep, 16 inches wide and 30 inches long.

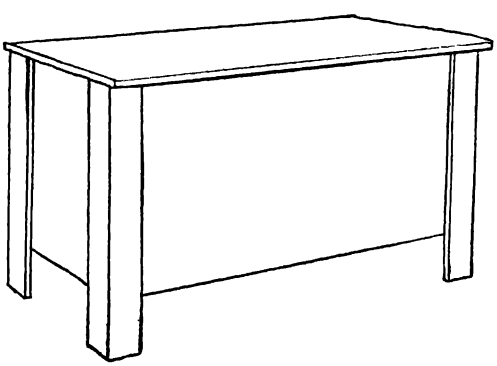
The top should be the ordinary thickness, about ½ inch or more if it is to be used as a window-seat, 3 inches wider than the width of the box, and 3 inches longer than the length of the box. You see that you cannot use the cover which came with your box for the top. Measure the box on the outside when estimating for the top. If you want your box useful as a window-seat, be sure that your top is very strong. It is better to have it ¾ inch or even 1 inch thick.

Cleats for the under side of the cover should be two strips ½ inch thick, 2 inches wide, and the length 2 inches shorter than the inside width of the box.

From the hardware store, get one pair of 2 inch iron hinges (butts) with screws ⅝ inch long.

For the legs, we need the usual four strips, ½ inch thick, 1½ inches wide, and 4 inches longer than the depth of the box; and four more strips ½ inch thick, 2 inches wide, and 4 inches longer than the depth of the box, or about 18 inches long, when your box is 14 inches deep.





Last of all we need a hinge-strip, ½ inch thick, 2 inches wide, and 3 inches shorter than the outside length of the box.

it for a window-seat, you may make a pretty cretonne cushion, and use the box part to store pillows when not in use.

The Materials Needed to Make the Box.

"A box, a box, my kingdom for a box." That is what the boys are saying these days, for Box Furniture is getting very popular indeed. You need not pay "a kingdom" for

Directions for Making the Box.

The list of materials needed may seem lengthy, but now that we have everything at hand it will not take long to complete the box. The legs are made in the usual way, and then screwed fast or nailed to the

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corners of the box after the lid has been removed. Take care to keep the tops of all the legs even with the top of the box. The cover is made 3 inches longer and 3 inches wider than the outside width and length of the box. It may be made of three pieces of smooth wood, butted tightly together, if you cannot find one board large enough. Place and nail the cleats on the under side, placing each cleat about 4 inches from the end of the cover. The nails may be driven from the outside and clinched on the under side of the lid.

Put the hinge-strip on the back of the box between the legs, keeping the top edge even with the back of the box at its top edge. Place the cover so that it projects the same distance all around. Put the hinges so that they are 6 inches from each end of the box. The hinges should be placed so that they can be screwed to the under side of the projecting back edge of the cover, and also attached to the hinge-strip on the back of the box. (See illustrations.) Carefully sandpaper the box, and fill with putty any cracks or holes. The box is ready for its coat of paint, or for the stain.

If it is to be used as a catch-all box and seat, the top may be upholstered by spreading a few thicknesses of cotton batting over the board, and placing over the cotton a piece of unbleached muslin which is drawn and tacked all around the edges. Over this, may be fastened some upholstery material of fancy cretonne, denim or brocade; and this may be held by large-headed nails, which give a pretty finish at the edges. You may give it a tufted effect by driving large-headed fancy nails down through the material and into the top of the lid. To conceal the legs, material to match the seat may be gathered and fastened all around the top edge. The inside of the box may be lined with unbleached muslin tacked fast in the corners and to the inside edge near the top of the box.

If placed near a window, it will make a most attractive window-seat, and may be made very comfortable and pretty with a few pillows "Pigs is Pigs," and coal boxes is coal boxes, I suppose, except such as have been dressed up in fine style and are entitled to be called utility boxes and window-seats.

HOW TO MAKE A BLACKING BOX

BLACKING shoes is almost fun, when the blacking box is handy; and no trouble at all when, by merely lifting a lid, we find brushes, polish and all, including a brace to hold the foot so it will not slip. That is what we have in this design,—a complete blacking box. The box is small enough to slip out of sight when not needed, and yet large enough to be of practical value.

Materials Needed.

For the main part, we need one butter box, which will be about 5 ¾ inches deep, 13 ¾ inches wide, and 14 ¼ inches long. For the top, we want two pieces of white wood ½ inch thick, each 1 ½ inches wider than half the outside width of the box, by 3 inches longer than the outside length of the box.

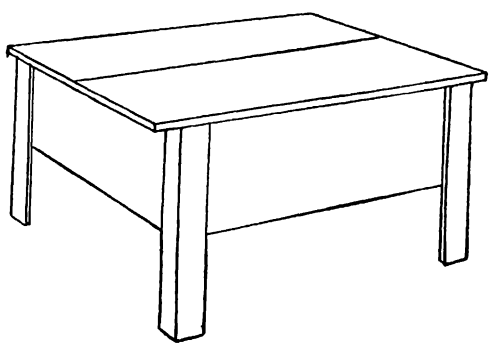
For the legs, we require four strips ⅜ inch thick, 1 ⅜ inches wide, by 7 inches longer than the outside depth of the box; and four more strips ⅜ inch thick, 1 ¾ inches wide, by 7 inches longer than the outside depth of the box.

For the sole-block, we want one block of wood 2 inches thick, shaped like the sole of a shoe. If you prefer, you may buy at the store a regular block like the boot-black uses.

In the line of hardware, we need some screws, and two 1 ½ inch hinges. The most desirable hinges for this purpose are the kind known as butt hinges.

Directions for Making.

Make the legs 7 inches longer than the outside depth of the box. The legs, you remember, are made by nailing together two strips, a narrow and a wider one, in such a way



that a right angle is formed. Remove the cover. Turn the box on end and nail on the legs. Now you may stand it right side up on the legs, and then nail on one part of the cover, allowing it to project evenly on the side and ends. You may hang the other half of the cover, placing the hinges in the joint between each half cover. Then, cut the edges of each half cover to let the hinges in even. Nail the sole-block on the under side of the hinged half of the cover. When you are ready to use your blacking box, turn this hinged side over on the part that is nailed down, and place your foot on the block.

Our blacking box is now complete, and ready for the varnish if we care to finish it in that way. However, it is quite as useful, though not as pretty, if we leave it without a stain or varnish. Before applying the paint, if you decide to finish it in this way, sandpaper the box and putty up all cracks or seams. Then paint it dark drab, brown or olive green. Two or three coats will be sufficient to cover the wood and give it a good appearance. If you use a prepared varnish, the weathered-oak finish is the most popular one. If your room is finished in white, you may

make your blacking box match by applying two or three coats of white, allowing each to dry before putting on the next.

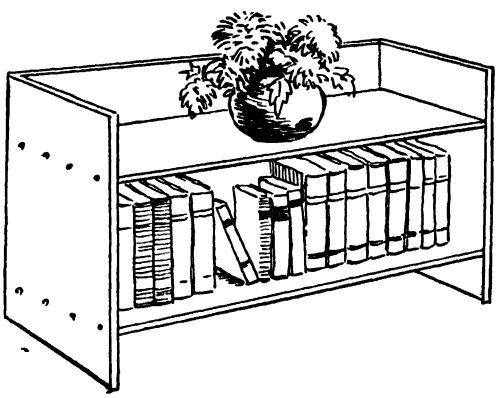
Every boy will surely want a handy box, when he knows how simple it is to put together, and how inexpensive it is.

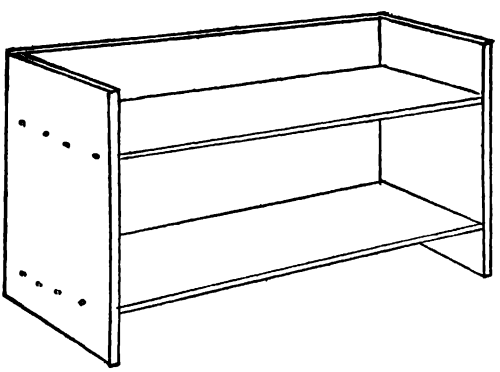
SMALL WALL RACK

THERE are a hundred uses for a wall rack. Placed conveniently over a desk, it will hold a number of reference books, and a bowl of pretty flowers on the top shelf. Placed in the sickroom, it will hold the medicines for the convalescent child, and a vase of fresh posies on the upper shelf. Placed in the kitchen, it will prove a great joy to the cook, for it is useful for holding the salt and pepper and the sugar bowl and the spice jars. These are merely a few of the ways that this handy article may be used.

Materials Needed.

Now we are ready for the box and the boy and his enthusiasm. His enthusiasm is needed in finding just the right kind of box for this rack. Hunt up your grocer and ask for a condensed milk box. If he has not a box with that name, keep busy until you find a box that has the following dimensions,—about 8 inches deep, 13 inches wide, 19 inches long. We also want two picture hooks and some picture wire.





Directions for Making.

Carefully remove the cover and set it aside, for you will want it later. Take off both sides by withdrawing the nails, and cut off each end of the sides, making them the exact length of the box inside. Keep up that enthusiasm, for there is more work to do. With your pencil and ruler measure and mark on the two ends of the box, a distance 2½ inches from the side edges. Set the sides in, keeping their outside faces on the pencil line, and secure them by nails driven through each end and the bottom.

Plane off all the edges necessary to make them even with each other, using sandpaper afterward to remove any blemishes. Bore a hole ⅛ inch in diameter in the centre of each end, 4 inches down from the top edge of the rack. Insert the hanging wires through the holes from the outside, and knot their ends tightly.

OTHER USES FOR THE SMALL WALL RACK

As a Wall Bracket for a Vase of Flowers.

The wall rack which has already been described may be used for a wall bracket to hold a vase, if we hang it up from one end only. There is then room for a tall vase of flowers to stand inside. Holes are bored 2 inches from the side edge and 4 inches from the back, and wire inserted.

As a Pipe Holder.

This same rack may be used for a pipe holder for grandfather. It is to be used on the wall in the same way as the vase rack by turning it on its end. A number of holes are bored in the top end a half inch in diameter or just large enough to hold the stems of the short pipes. Little hooks, driven in the back near the top, will serve to hold the long pipes; while slight depressions gouged ½ inch deep on the inside face of the bottom end will hold the bowls.

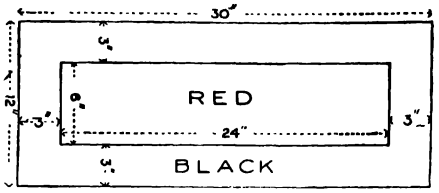
As a Kitchen Handy Rack.

Would you imagine that one article could have so many uses? By making a few changes our wall rack may be useful to the cook as a holder for spoons, knives and forks, salt, a rolling pin, etc. With your pencil and ruler, find the middle of the top shelf. Then measure off to the right and left, distances of 2 inches, and mark the points on the edge of the shelf. Measure back 2 inches from the front edges of the rack and place six points 2 inches apart. Then bore two rows of holes ¾ inch in diameter. The centre of the first row is ¾ of an inch from the front edge. Cut slots ¼ inch wide from the front edge to the first row of holes. In boring the holes, be careful not to tear off splinters, and as soon as the point of the bit is felt coming through the wood, take it out and bore from the other side to make your holes smooth.

HOW TO MAKE A LITTLE WOOL MAT

A CANVAS rug mat, which is quite easy to make, can be used to go under the piano or the writing-table, or, if we like to make a tiny one, it will do for a doll's baby carriage or a toy motor-car.

Let us make, for a first attempt, quite a small mat, say, one measuring thirty inches in length and twelve inches in width. One advantage in letting the mat be twelve inches wide is that a canvas that width can be bought at so much a yard, so that all we have to do is to cut off thirty-one inches from the yard length; the extra inch is to allow for folding over half an inch for tacking at each end. These folds need stitching down securely, because the canvas is stiff and springy, and the rough edge ravels easily.



1. The measurements for the mat.

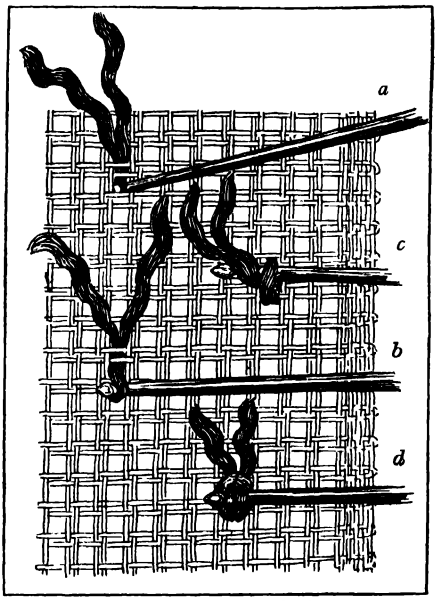
The next point to decide is the kind and quantity of wool. Girls and boys who are good at reckoning will find the canvas for our mat has two and a half square feet in it, and we shall want about three-quarters of a pound, or 12 ounces of twisted cable rug wool at about 50 cents a pound for each square foot of canvas. Sums in carpeting and papering are sometimes dry, uninteresting things to do, but we are going to find a carpet sum useful in planning our own mat. Have you found how much wool we shall want? Nearly two pounds, is it not? Then we will buy two pounds, for the small quantity left over will be certain to come in useful when making another mat.

But we do not want all the wool to be of the same color. Our rug must have a border round it of another shade. Suppose we buy three-quarters of a pound of red wool for the centre, and the remaining one and a quarter pounds of black wool for the border

We shall need a wood gauge, costing a few cents, or a strip of cardboard for measuring off lengths of wool, because it is necessary to have all the little pieces of wool for the mat exactly the same length. We also want a rather large wooden crochet hook, and to line the mat when finished we shall need half a yard of some dark material such as black linen. A suitable kind is sold at most dry goods stores usually measuring forty inches in width.

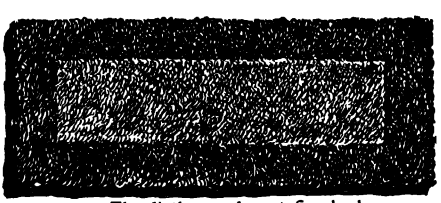
Having collected the materials, we set about planning our mat. Look at picture 1. With a pencil or piece of chalk we mark the border on the canvas at the same distance from the edge—three inches all the way round, so that the central part measures twenty-four inches by six.

Next, we take the black wool and wind it round the gauge or piece of cardboard—about four inches long—winding evenly, but not straining the wool. Then we cut along the groove in the gauge, or along the end of the cardboard.



2. Pulling the wool through the canvas.

With the canvas before us on our knees, and the right side uppermost, we take up a piece of the black wool, untwist the two strands, and, doubling one of them in halves, apply the loop with the fingers of the left hand to the hole in the right top corner of the canvas. With the crochet hook in the right hand we pull the loop down through the hole and up through the next hole to the right. Still keeping the hook in the loop of wool, we next draw the two ends of the wool through the loop so that they stand up from the canvas erect. This is quite easy to do, though it takes many words to tell how it is done—*a* and *b* in picture 2 show the hook through the hole; *c*, the ends being caught by the hook; and *d*, the ends on the point of being pulled through the loop. We tighten and adjust the ends with the fingers; then we take up the other strand of the split wool and fasten it in through the next hole.


3. The little wool mat finished.

We proceed with the same wool along the edge of the canvas until we have filled the rows of holes three inches deep. Now, continuing with the black wool at the beginning and end of the row only, we fill the middle part of it with the red wool We go on filling up the rows like this until we reach the beginning of the three-inch border along the second side, and from that row continue with the black wool only.

If at any point we find the wool getting too thick and close together, the best thing

to do is to leave a hole empty of wool. We have chosen black for the border and red for the centre, but twisted rug wool is made in many colors, and there is a large choice of reds, yellows, blues, browns, and greens. We should, of course, think of the color of the carpet when choosing the colors for the mat, and let them match or blend with that.

Having filled the canvas, we now look it over carefully, give the rug a good shake, see that the strands of wool are all the same length, and cut even with the rest any that stand out.

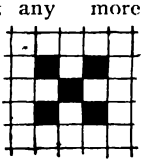
Now we must see about lining the mat with the black linen. This is first cut to the shape of the mat, the edges are turned in, and it is laid, glazed side out, on the back of the mat. It is then sewn neatly and evenly with strong thread round the edge of the canvas. We must be careful to press the wool quite away with the left hand while we are sewing, or we may possibly catch it in the thread.

For the little mat which we have been making we have been splitting the twisted cable rug wool into two strands. If we wanted a heavy mat with very thick pile, we could leave it untwisted. In this case we use the same quantity of wool, but work into every other hole of the canvas. Jaffa rug wool at about 40 cents a pound is also used for rug work. It is composed of six fine strands instead of two thick ones as was the case with the wool used in making our mat.

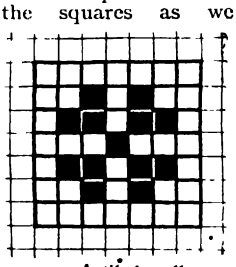
All kinds of pretty patterns are possible in canvas work, and even a patchwork mat of odds and ends left over from previous mats may look very well. But it is unwise to attempt very complicated patterns at first. Having once made a mat to our satisfaction, it will be easy to make another much bigger, which might be used for a carriage rug, a hearth rug, or perhaps for a footstool cover.

WHAT TO DO WITH A CHEAP EXERCISE BOOK

IF we get a cheap exercise book ruled in squares, which can be bought at any stationer's store, we shall be able to make all the pictures on this page and many others which we can invent for ourselves. All we have to do is to fill in the squares with crayons or black lead pencil or different colored inks Let us begin with a simple pattern like the first picture on this page, and try to copy it very neatly and carefully. We must begin at the top and count the squares as we



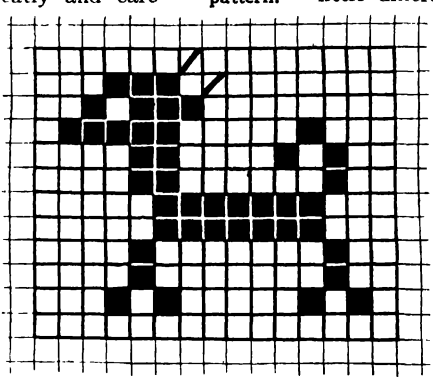
1. An easy pattern.



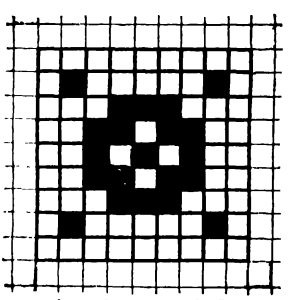
2. A tiled wall.

color them in. Let us take the first line. We will make up our mind where we are going to start in the exercise book and then, as we do the first square, say "*make* a square," then "*miss* a square," then "*make* a square" This gives us our first line. Now between the two squares that have been filled in in the first line we color a square in the second line, and after this is done the third line can be done in the same way as the first. Thus we have our first sample pattern.

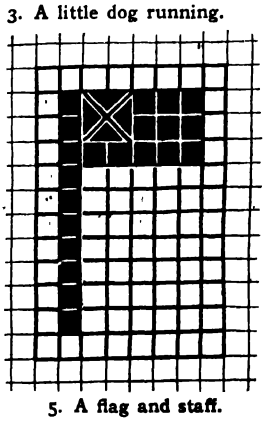
If we have crayons, or colored pencils or inks, we can make the middle square red and the others blue or green or yellow. If we like, we can make a row of patterns like this, and then we can try something more difficult like the patterns shown in our second and fourth pictures. The second is like a tiled wall, and the fourth like the floor of a church Now let us try something more difficult still, and at the same time more interesting, like the flag in picture No 5 In order to get the cross at the top left-hand corner, we have to treat the squares there a little differently, but the picture shows us clearly how to do this And now, having had so much practice, we can begin to make all kinds of pictures, animals, birds, flowers, engines, houses, castles, and so on. The little dog which is shown in the third picture on this page shows us how to make curves and bends like those of the tail and legs.



3. A little dog running.



4. An inlaid church floor.

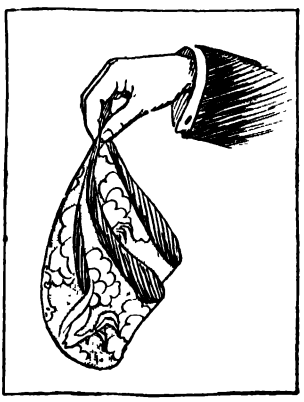


5. A flag and staff.

When you have learned to do these in pencil, buy at any toy store some sheets of *pricked* paper. You will find tiny holes pierced in the corners of the squares, and you can make these same patterns in silk crosses with the aid of a needle by taking the thread in and out of the paper from corner to corner of each square.

THE WIZARD'S POCKET-HANDKERCHIEF

ON page 1361 we learn how to "lose" a coin from a handkerchief. In this case a coin is likewise made to disappear, but after quite a different fashion. The handkerchief used is a colored one, and the wizard's own property. We will suppose that the trick is to be performed with a quarter. The conjurer gathers up the four corners of the handkerchief, as in picture 1, and has the quarter dropped into the sort of bag thus formed. He proves that the coin is really there by making it chink against the table-top, or allowing somebody to feel it through the handkerchief. But presently he says: "Quarter, vanish!" or something to the same effect, and the coin forthwith departs. The handkerchief is shaken out, but nothing falls. But the performer explains that the coin has merely stepped round the corner, and will come back again if desired. Again he gathers up the four corners of the handkerchief and says: "Quarter, come back." Again he makes it chink upon the table, and allows anybody to feel that it has really returned. He now says: "Quarter, pass into that vase upon the sideboard," or any other place he likes to mention. Once more the coin has disappeared, and is found where he has told the audience that it would go. The secret here lies in the handkerchief, which is one that has been specially prepared for the purpose of the deception. If the young reader is a boy, he will have to get the assistance of some relative—a sister, a cousin, or an aunt—to make it; if a girl, she can do the needful work for herself.



1. The handkerchief held by the four corners so as to form a bag.

The pattern of the cloth of which the handkerchief is made does not matter, but it must be double, being in fact two handkerchiefs of the same pattern sewn together all round the edges, save for one small opening. This is at the corner B in picture 2, where for a space of an inch and a half each way the two handkerchiefs are not joined together. This leaves a space between the two handkerchiefs, and this space is the secret of the trick. The two handkerchiefs must also be joined together by a diagonal line of stitching from the bottom of the opening at B to a point an inch short of the C corner. As it is important that this line of stitching should not be noticeable, the handkerchiefs used must be somewhat dark in color, and the more intricate the design the better it is.



2. The secret of the magic handkerchief.

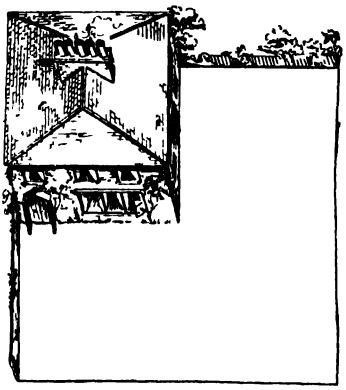
When it is proposed to show the trick, the first step is to hide a quarter beforehand in some convenient place, to be found there when necessary afterwards. The handkerchief must be held in the first instance spread out four-square, the corner A between the thumb and fingers of the left hand, and the corner B between those of the right, but with the little mouth at B kept open by inserting the tip of the forefinger in it. The performer then gathers up the other corners one by one into this same hand, forming a sort of bag, as in picture 1. He then asks someone to lend him a quarter, and to drop it himself into the bag thus formed, in reality offering him the opening at B, so that the coin actually falls into the space between the two handkerchiefs. To avoid mistake, it is well, for the moment, to hook both forefingers into the opening. The coin may now be made to rap upon the table, or be felt through the handkerchief. This done, the performer lets loose the corners C and D, but nothing falls, the quarter running down the line of stitching to C. By again picking up the four corners, the coin is brought back to the centre.

The performer now orders the quarter to go to the spot where he has placed the duplicate coin, and once again shakes out the handkerchief four-square. He then drops the corner A, and with the left hand takes hold of the corner C, holding the handkerchief straight up and down, and giving it a shake as if to call attention more forcibly to its entire emptiness. While the attention of the spectators is occupied in seeing whether the quarter has reached the place named, he works the first coin through the opening into the left hand and gets rid of it.

If you perform the trick neatly, you may be asked to do it again, but it is seldom wise to do a trick twice over before the same spectators. Should anyone press for an *encore*, your best plan is to exhibit instead some trick more or less resembling the first one. In the present case, the disappearance of the quarter makes a capital introduction to that of a coin, as described on page 1361. You agree to "do it again"; and this time you say you will use another coin and somebody else's pocket-handkerchief. You keep your word—that is, you again lose a coin from a handkerchief; and the trick being the same *in effect*, the audience does not realize that it is really quite a different one.

HOW DID THE FATHER DIVIDE HIS GARDEN ?

A GENTLEMAN, who was a merchant in the city of London, decided to live a little way out in the country, where he could have a larger garden than could be obtained in town. So after looking about for some time he found a very nice house with a fine garden, and the house stood on one quarter of the ground as seen in our birdseye view of the place. After taking his wife to see the house, the merchant bought it, and soon moved with his family to the new home. Now, this gentleman had two sons named Harry and Leslie, and two daughters, Doris and Gertrude, and they were all very fond of gardening. They at once asked their father to divide the garden up among them, and to allow them to cultivate it, and when the summer came they would see whose particular part had the best show of flowers. The father readily agreed, for he knew that his children would do their best, and this arrangement would save him the trouble and expense of engaging a gardener. Besides, it would provide plenty of healthy recreation for their spare time, and so he said he would divide the garden up into four parts of equal size and shape, and give one to each. The boys and girls could not see how their father would be able to do this, because the garden was already such an awkward shape that it did not seem at all an easy matter to divide it as he said. But the gentleman did it, and the boys and girls agreed that it was really very simple after all. How was the garden divided as the father promised ?



SOLUTION TO BE FOUND ON PAGE 2583

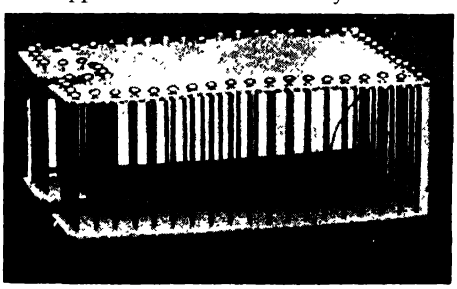
A CAGE MADE OF CARDBOARD AND PINS

THE little cage of mice shown in the picture is made of cardboard and pins, and costs a good deal less than a dime

First we buy a large sheet of perforated cardboard. A store which supplies kindergarten goods will sell us this. Then we cut out of this sheet two pieces, each measuring two and a quarter inches long and two inches wide.

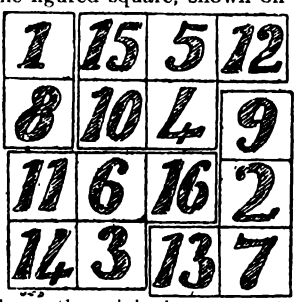
We want some large brown apple-pips, which we can save from the next apple we eat

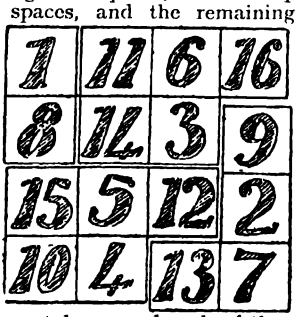
We choose a rather fine needle, thread it with black cotton and pass it through a pip, beginning at the narrow end, and leaving a piece sticking out to form the tail. We then pass the needle down through a hole in one of the pieces of cardboard, stitch down the tail where it joins the body, and secure the cotton on the under-side of the card. Two or three more mice are dotted about the card in the same way. Next we get some bright new pins to fit the holes in the card without slipping out, and these we run through the holes along the edge of the second piece of card. A notch at the end imitates the door in the cage, as seen in the picture ; and the pins follow round the edge of the notched part. We press the pin down so that its head lies close to the card. Then we put the point of the pin into the corresponding hole in the card with the mice in, and this forms the floor of the cage.



HOW THE MAGIC SQUARE WAS MADE

A STUDY of the two illustrations given here shows how the figured square, shown on page 2356, was cut up and put together again in a different way, so that it became a magic square—that is to say, a square, each column, horizontal row, and diagonal of which, when added up, gives the same result. The first picture shows the original square cut into four pieces, one piece containing two figured spaces, another piece four figured spaces, and the remaining two pieces each containing five figured spaces. The second picture shows these four pieces arranged in a new and magic order. It will be found that every column in this arrangement makes 34 when added up, and that every horizontal row and each of the two diagonals give the same result, thus forming a magic square.





WHAT SCENE IN HISTORY IS THIS?

THE GAME OF "WHAT IS IT?"

HERE are some puzzle games to be played sitting round the fire, similar to those which appeared on page 2362. Below are descriptions of famous scenes in history. The solutions will be found on page 2588.

AN ANGRY SCENE IN A TENT

1. We are in a tent in a meadow by the bank of a river. In the tent are gathered a number of men armed after the fashion of the Middle Ages, and through the opening of the tent we see troops standing. The men in the tent look angry and determined, and bend threatening looks on one who is the centre of attention, and wears a crown. The foremost man of the group is urging him to put his sign to a document spread out on a table before him. At last he consents, sets his seal on a lump of wax, and throws himself on the ground in a rage. Who is he, and what is the deed that he has been forced to do by others and now so very much regrets?

THE LANDING OF A BRAVE BAND

2. We are on the coast of a wild, uncultivated country. Behind the bare rock on which we stand, forest stretches away inland. Off the shore is a small bark at anchor, and from it we watch men, women, and children landing. They are dressed in plain garments, and seem to belong to the artizan class. They are evidently weary, yet how brave they must be to cross that wild sea in their small boat of 180 tons, and land with their little children on an unknown shore Who are they, and why have they come here, where there is neither shelter nor food ready for them?

THE ROBBER AND THE LITTLE PRINCE

3. It is a time of anxiety and danger All the countryside is disturbed by war A battle has just been fought, and in the forest, near the battlefield, a mother and her boy have sought refuge While wandering about hoping to escape notice, some robbers discover the mother and her little son, and take from them their money, jewelry, and food, and then leave them. It is April. The trees are leafless, and the poor mother is anxious for her boy, who has been reared in the comfort of palaces. While seated on a tree-trunk, she hears a footstep on the dry leaves, and, fearing it is another robber, her heart fails her. Then she thinks of her boy, who should one day be king of England. She rises and faces the newcomer, who is indeed a robber, but her pleadings rouse the pity of the man, who promises to take her and her boy safely to the coast, so that they may be able to escape to France. What incident is this, and does the robber keep the promise that he has made to take them to the coast?

THE WRITING ON THE CHURCH DOOR

4. Before us is a heavy church door studded with nails. A monk advances from the street holding a paper in his hands. He has a look of stern determination, and walks straight up to the church door. Now we can see that the paper is covered with writing. The monk takes from a bag a hammer and some nails, and fastens the document on to the door; then he stands aside to watch the result. Some townsmen have been watching him, and curiosity prompts them to see what the daring monk has nailed to the church door. Three years later, at the gate of the castle near by, the same bold monk burned in a bonfire another document, while the people stood round in a crowd and watched him. Who was the monk, and what were the documents?

AN INTERRUPTED GAME OF BOWLS

5. We have before us a bowling green, where men are intent on their play. Near by stands a man gazing out to sea across the harbor. He pays no attention to the game, but stands shading his eyes from the sun with his hands. Suddenly he sees something, for he turns, and, striding up to one of the players, eagerly points out to him the beacon being lighted close by. But to his surprize the player goes on with his game of bowls, coolly remarking: "There is plenty of time to finish the game and beat the Spaniards too" Yet, all around, people are gazing out across the harbor, or making hurried preparations. Evidently some great event is about to take place, and all the men look determined though anxious What incident is this?

THE GREAT MAN ON A LITTLE ISLAND

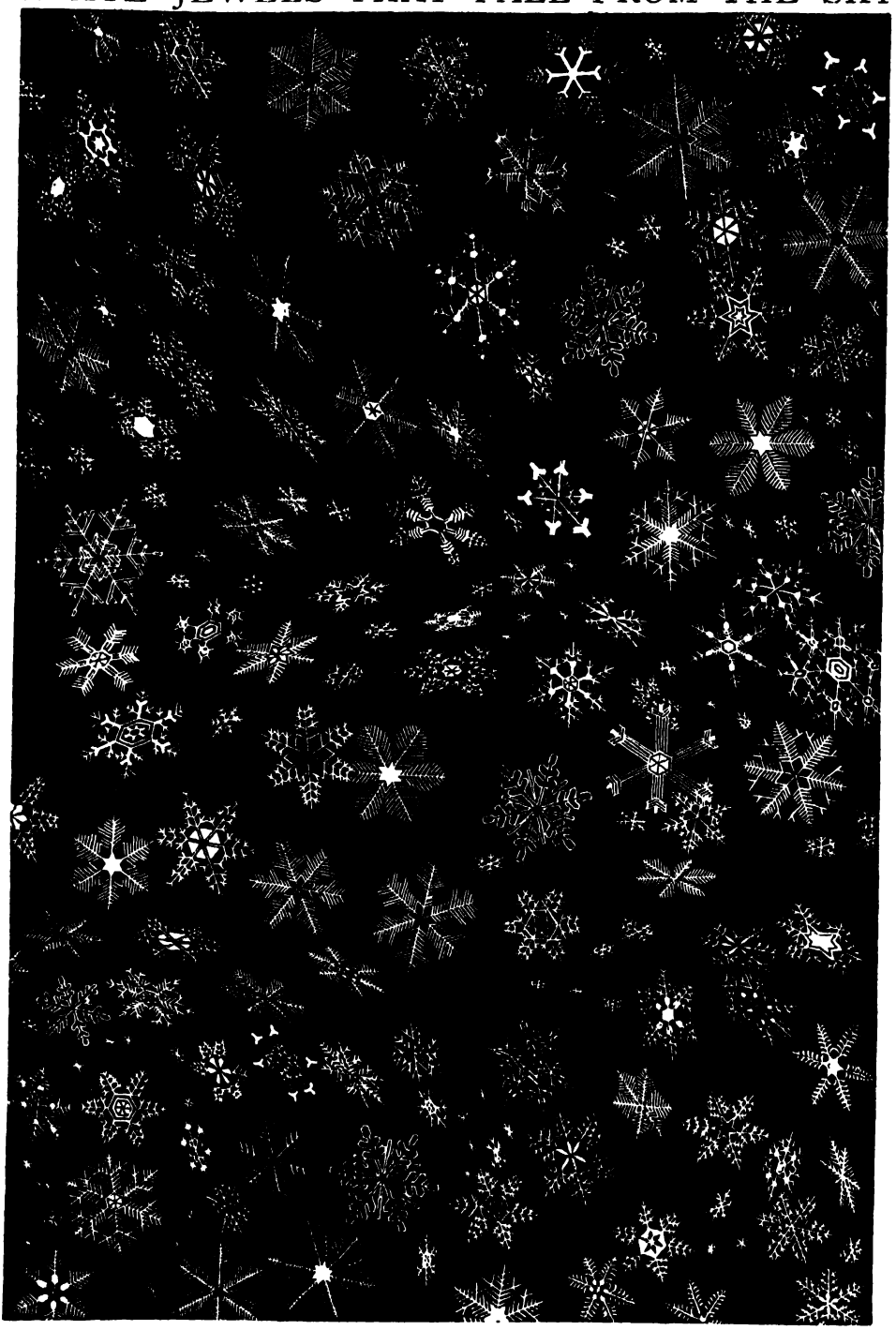
6. We are on a small island, only about 86 square miles in extent, in the blue waters of the Mediterranean and within sight of the coast, where fishermen and iron-miners live. Before us is a large building, and through one of the windows we see a man seated at a table He looks sullen and unhappy, as though he were brooding over his misfortunes, for he has fallen from greatness. Yet the power that he had was not used to help mankind; rather was it used to overreach others and subdue them to his will. No wonder he is unhappy and looks miserable! Sitting there in gloomy thought, he plots how he will escape from this island, which was given to him as his dominion, because it was thought he could there do no further mischief Who is the man described here?

THE ANSWERS TO THE GAME OF WHERE IS IT ON PAGE 2362

ON page 2362 are some descriptions of places to be guessed. These are the places: 1. Benares, India. 2 Petrograd 3. Upper Burma 4. Cape Town. 5. Plymouth Hoe, England. 6 Canadian Pacific Railway in Manitoba. 7. Tahiti, Society Islands, Pacific Ocean.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 2581.

WHITE JEWELS THAT FALL FROM THE SKY



The most dreary scene looks beautiful when covered with a mantle of snow, but it is not only thus that snow is beautiful. If the newly fallen flakes are examined through a magnifying glass, they are seen to be made of delicate crystals arranged in star-like forms as here. It is rarely, however, that more than one or two of these forms fall at one time. When the flakes are pressed together, they lose these dainty shapes.



WINTER'S WHITE DIAMONDS

CONTINUED FROM 2433

THERE are many roads that lead to fairy-land, and many fairy palaces when you arrive in that beautiful country. Shut your eyes for a moment and we will go to the Palace of the Frost King. Where is it? High up above the earth; far above the clouds, in the wide realms of space.

There, where it is cold and still, the tiny drops of moisture in the air crystallizes into snowflakes which the uprushing winds support until they are ready to obey King Frost's commands. The snowflakes are very small at first, but helped by Air and Water and Electricity they soon gain in structure and weight, and begin to fall. As they descend they make war with the elements. Some enter dark, surging masses of cloud, and when they emerge their external form is changed, and they have become larger and less regular in outline. Others pass through gray stretches of cloud where it is so cold that the little snowflakes hug themselves close together and hurry on. Then a rollicking, boisterous wind meets them and waves them up again towards the sky, but their snow brothers are pouring forth in countless numbers from the realms of space down upon the world, and they too turn earthward again.

At their coming the world is changed and beautified and silenced, for the Frost King allows no sound but the report of his own gun as it discharges in the heart of a tree or in the depths of a rock when he goes hunting. He himself comes to earth most often in the night, for he works best beneath the light of the stars or moon. In the early morning, when the sun rises, King Frost is up and away to his fairy palace, and even if you are out early you will find nothing but the traces of his beautiful breath bejeweling wood, and field and rock.

But the snow crystals come at all times. Any morning in winter we may wake up to find the world white and sparkling beneath their covering. Or at noontide the day may grow dark and gray and overcast and the snowflakes begin to strew the earth. Soon common things have lost their outline,

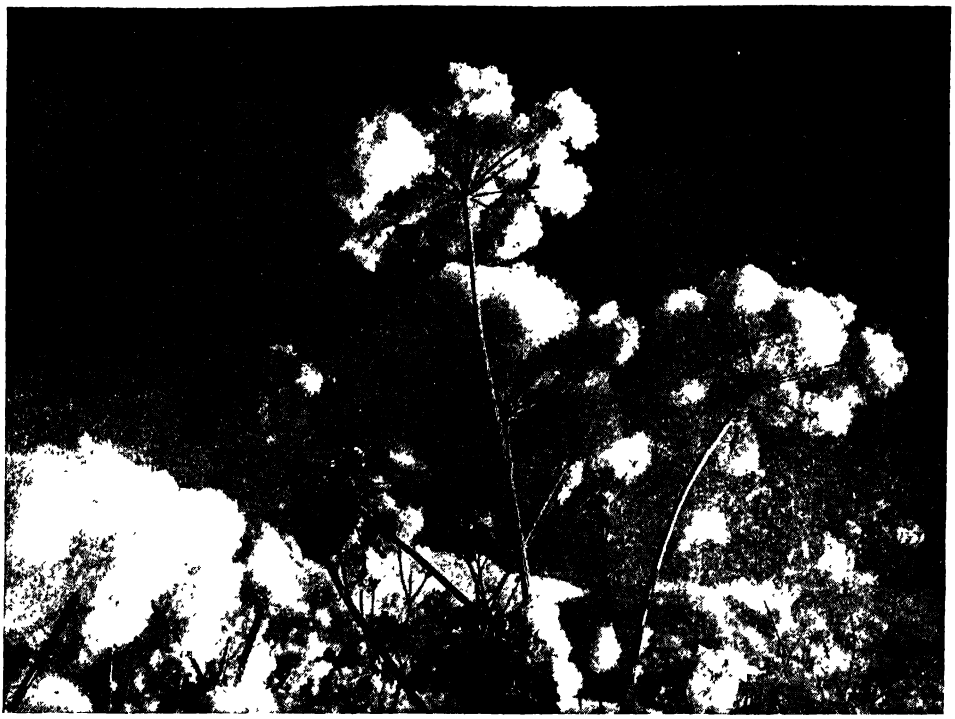
"Every pine and fir and hemlock
Wears ermine too dear for an earl,
And the poorest twig on the elm-tree
Is ridged inch deep with pearl."

Let us capture one of King Frost's little fairies and look at it through our microscope. It has been a big storm and so we have caught a perfect crystal. The snow crystal will soon escape us and resume its original watery form; how can we get its picture before it goes? Drawing would take too long, but a microscope fixed to our camera, and lo! we have our snow fairy complete. Is it not beautiful?

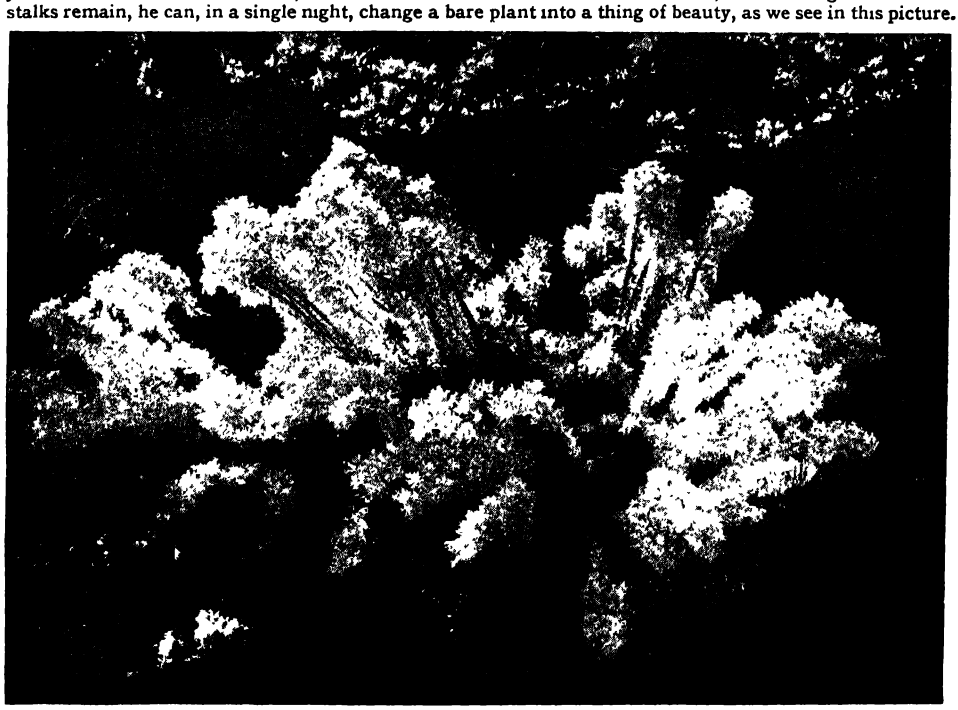
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THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 2833.

THE BEAUTIFUL WORK OF THE HOAR-FROST

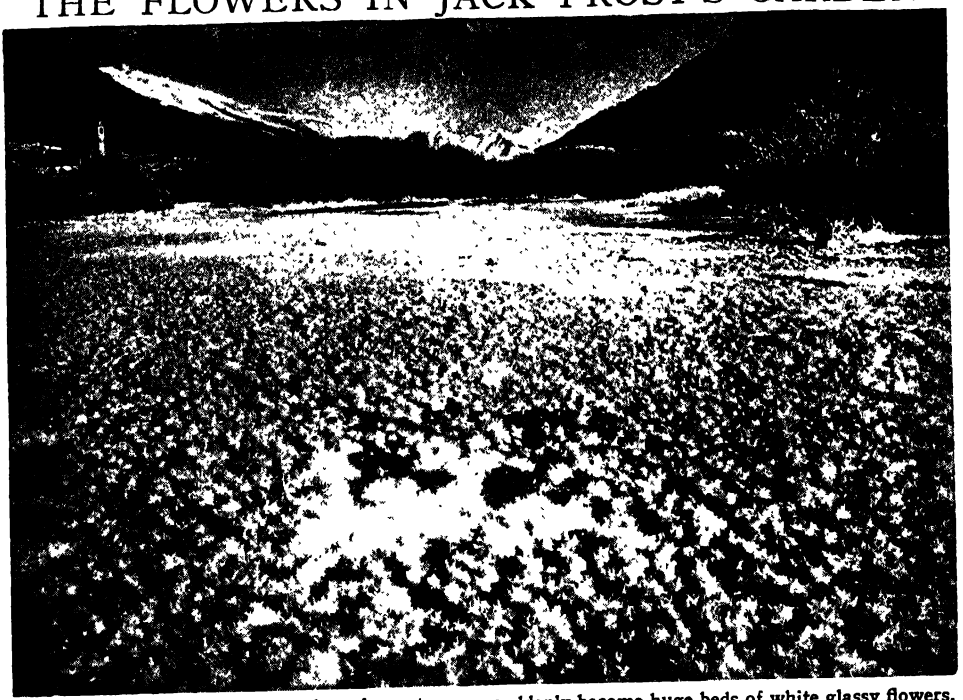


Jack Frost is a wonderful artist, and when the flowers and leaves have fallen, and nothing but the bare stalks remain, he can, in a single night, change a bare plant into a thing of beauty, as we see in this picture.



Even the tall, straight reeds that grow by the river blossom with glistening white flowers, equal in their delicate beauty to the flowers of summer. The ice flowers in this picture were formed on rushes growing in a frozen river, and everywhere the hoar-frost—which means simply white frost—had decorated the landscape.

THE FLOWERS IN JACK FROST'S GARDEN



Sometimes whole fields and stretches of country may suddenly become huge beds of white glassy flowers. Here we see a bed of frost flowers on the bank of a frozen river. The crystals of hoar-frost that make up these flowers, if seen through a magnifying glass, look very like the beautiful snow crystals on page 2524.



It is not only upon trees and grass that the hoar-frost takes such pretty forms. This picture looks like a mass of delicate white coral, but it is really a picture of piled-up crystals of hoar-frost, as they were deposited, many inches deep, upon a stone. Any stone lying in the road will look like this after a heavy night frost

The photographs on these pages are by Prof. R. B. Young, G. R. Ballance, Percy Barron, and G. P. Abraham.

HOW WINTER PAINTS THE WORLD WHITE



A beautiful effect is produced by the deposit of hoar-frost upon bare trees, like the birch shown above. Every branch and twig shines as with gleaming silver.



When the deposit of hoar-frost is heavy, the effect is remarkable, as we see here, but much of the delicate beauty is lost by the massing together of the crystals.



Travelers go to Switzerland in the summer and are delighted with the beauties of that wonderful country. But its glories in winter, though different, are not less delightful than in summer This picture, showing a home among the Swiss mountains, shows us how beautiful the scenery may be made, even in the colder weather, by the touch of the snow. The houses, trees, and ground all wear their white and glistening mantle.

WHITE PLAYGROUNDS IN THE MOUNTAINS



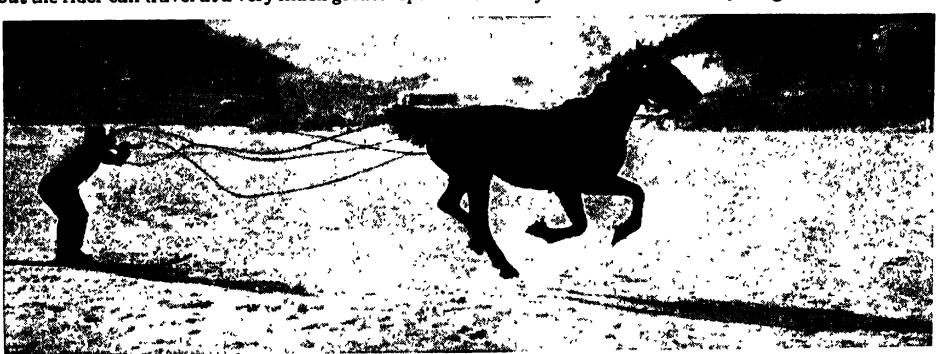
There is no more exciting sport in countries where the snow lies for months at a time than tobogganing. We read about tobogganing on page 2355, and here we see five men winning a toboggan race in Switzerland.



When only one man rides on a toboggan, he lies down full length, like this. The position is not so comfortable as sitting up, but the rider can travel at a very much greater speed in this way.



A delightful sport in the lands of the snow is ski-running. Skis, pronounced "shees," are like skates with very long wooden runners.



Very exciting, though dangerous, is ski-racing with horses. The runner holds a rope attached to a horse, and the animal pulls him along at full gallop. It is difficult to keep one's balance, and a fall may be serious.

THE CRASHING OF AN AVALANCHE

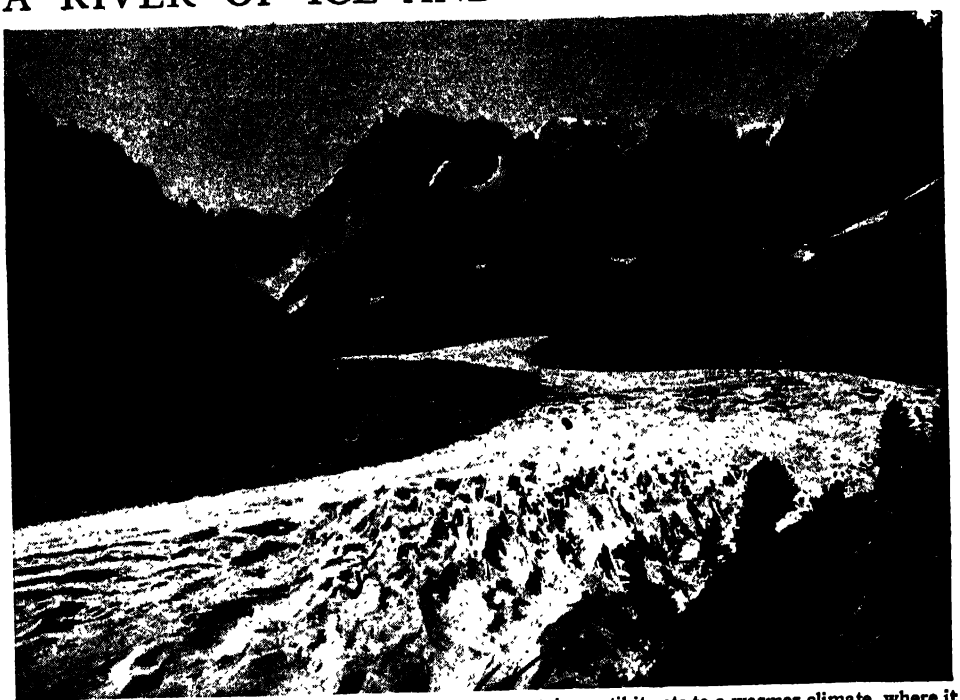


Avalanches are a serious danger in the mountains and valleys of Switzerland. These " thunderbolts of snow," as Byron called them, crash down from the mountains, destroying everything in their way, and the fierce wind that they make, by driving the air in front of them, roots up trees and carries away houses. Forests are specially planted on the slopes of the Alps to break the force of avalanches and save the villages, and here we see the end of an avalanche that has broken through a forest, destroying hundreds of trees.



The word avalanche means " to the valley," and in some of the valleys no houses can be built, because these mighty snowballs, many of them weighing more than a ton, are constantly crashing down, filling up the valleys. Sometimes, when the snow is squeezed into ice, it slides down like a mighty land-slide. The least thing will set an avalanche traveling, even the shout of a boy. This picture shows what an Alpine valley looks like after Nature has been playing at snowballs. A falling avalanche makes a roaring noise, terrible to hear.

A RIVER OF ICE AND WHAT IT CAN DO



A glacier is a river of ice which flows down from the mountains until it gets to a warmer climate, where it melts. Although it is always moving, it does not run fast like an ordinary river. It may travel only a foot a day. This picture shows the glacier at Chamounix, Switzerland. In Greenland some glaciers are half a mile thick and fifty miles wide, and when these flow into the ocean and break up, they discharge fleets of icebergs.



Examples of the great glaciers which once covered much of our country still exist in Alaska. We know this because we can see the scratches and marks made by the traveling ice; and we also find, in different places, great boulders of rock which were carried down by the glaciers and left where the ice melted. In this photograph, taken by Professor Young, we see the track of a glacier that flowed long ago.

THE GREAT WHITE TOPS OF THE WORLD



There is something very wonderful in the sight of the great snow mountains, and hundreds of people go to the Alps every year to climb the snowy heights, as we see them doing here. It is often necessary to wear blue or green spectacles, because the glare of the snow, when the sun shines upon it, injures the eyes.



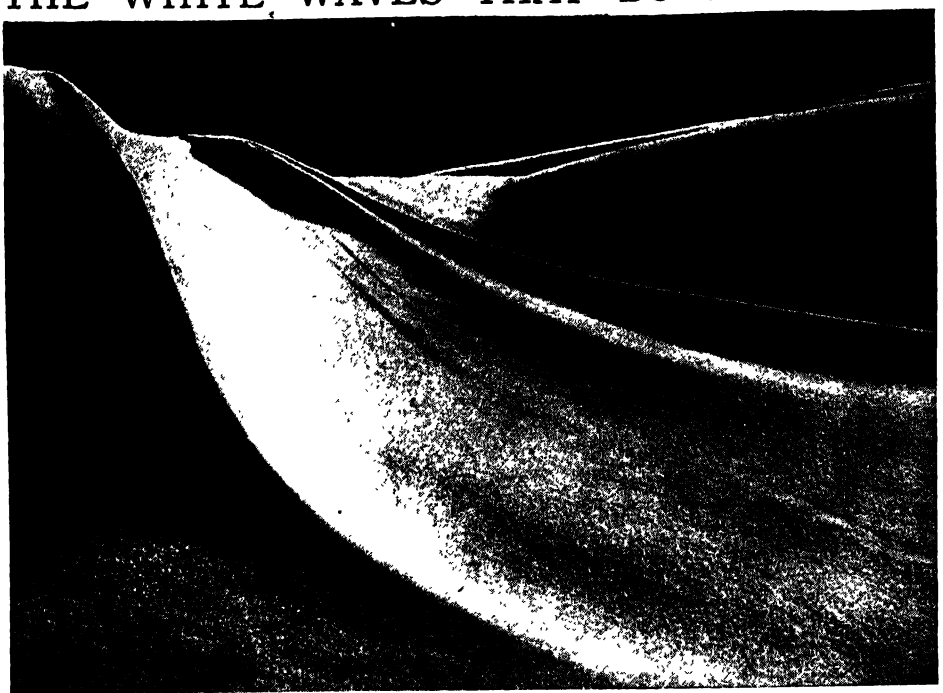
We do not often think of mountains or snow in connection with Australia, the great flat continent in the sunny south. But there are mountains there, the tops of which are always covered with a mantle of snow, and here we see some travelers struggling up one of the steep white slopes of Western Australia.

THE COLD OLD MAN OF THE SNOW

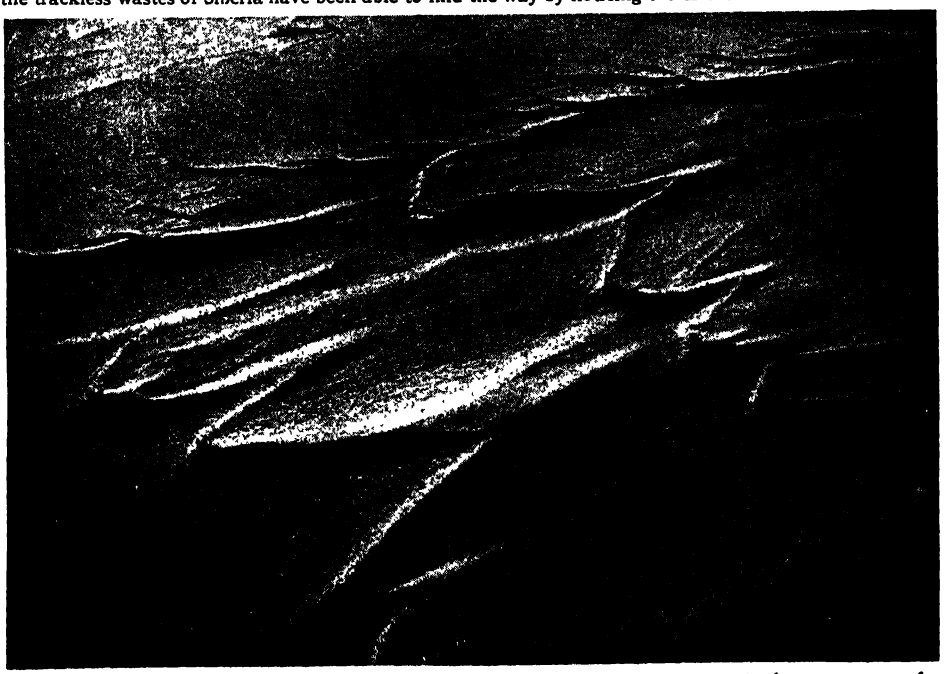


This is the first Snow Man built by the little reader of the Book of Knowledge who stands beside it. For days he stood in the centre of a lawn, looking terrifying in the moonlight nights. Then the little girl would look at it from her window and almost be afraid of the man she had made. At last the Snow Man melted, disappearing slowly until he was but a speck; and then, as the sun shone upon it, the tiny speck of snow changed into a tear, which sank into the earth as if in mourning for the Snow Man who had passed away.

THE WHITE WAVES THAT DO NOT MOVE

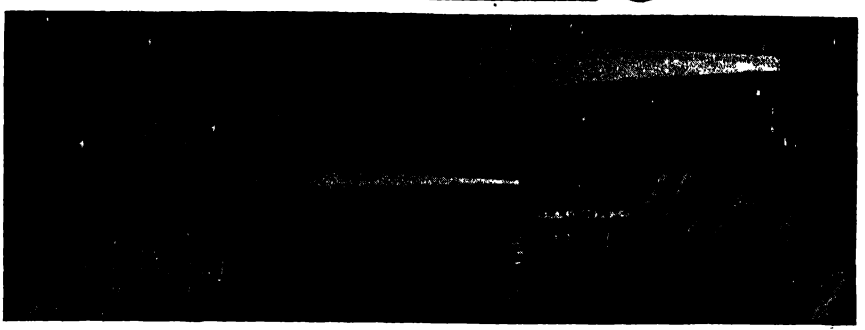


When we speak of waves we usually think of the sea, but there are waves of snow as well as waves of water, and here we see how the wind blows the snow into ridges, or waves, across hilly ground. Travelers lost in the trackless wastes of Siberia have been able to find the way by noticing the direction of the snow-waves.



On the level ground the waves are seen more plainly. Sometimes the snow presents the appearance of a choppy sea; at other times there are gentle ripples all over the surface. It is the newly-fallen snow that is blown into waves, and a curious sight can be seen after a cold night, when the waves formed during the day are frozen hard, and we have the almost unnatural sight of waves that are quite motionless and firm.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 2833.



DOES LIGHT DIE AWAY?

CONTINUED FROM 2475

IF it were the case that light were stopped and made into nothing as it traveled through the ether, half of the things we believe about the sky would have to be given up; but ether does not soak up, or absorb, any of the light it conveys. Of course, light may disappear between a star or a planet and our eyes because it is stopped, not by the ether, but by something material, such as sky dust.

The light of a star will disappear if the star grows cold and "goes out." Any star we see to-night may already have gone out—for the light we see it by left it long ago. Though light may be so steady and seem so permanent, yet we must think of it as we do of an electric current. Light really is a sort of electric current. It has to be made and kept up from moment to moment. To make light you must—or a star must—*spend power*; and if the new power is not forthcoming the light will cease, just as an electric current will cease if the battery runs down. So that light dies away if you do not continue to make it.

HOW FAR CAN LIGHTNING BE SEEN?

We can be sure that lightning can be seen for very many miles. We can judge the distance of a lightning flash by counting the number of seconds between the lightning and the thunder. Probably only the roundness of the earth prevents us from seeing lightning still farther than we do, for, of course, the time comes when the light, as it flashes through the air, will be cut off from the eyes of people far away, because they are, so to say, "round the corner" of the earth. In questions like this we must remember that light can travel to any distance, and will, indeed, travel to infinite distances so long as nothing stops it. Thus, if the light remains bright enough for our eyes to be affected by it, we can see, as we say, to the distance of the thing which is giving out the light. Thus, when we see a star, we see to a distance of billions of miles.

DOES LIGHT GET FAINTER AS IT TRAVELS?

We know that the farther off a bright thing is, the less bright it seems. We know that the little moon, or a planet like Venus, is brighter than the stars to our eyes, though not a ten thousandth part so bright in reality, because it is near. Yet we said in the answer to the last question that light will travel on for ever unless it is stopped. So far as we can judge, light, as it travels through the ether, suffers no loss at all; none of it is absorbed or lost.

Yet we know that, somehow, light gets fainter as it travels. The reason is that the light spreads in all directions as it travels, and so gets less intense at any particular place—as, for instance, where it strikes the curtain, or retina, of our eyes. If you have ever played with a magic lantern, you

know what a bright spot of light it throws when it is placed near the screen, but when it is moved farther away the light gets fainter as it gets wider. The law governing this is known precisely. If the distance is doubled, the light is one-fourth as bright; if trebled, one-ninth as bright; if quadrupled, one-sixteenth as bright. To get the intensity, you must take the square of the distance —*i.e.*, multiply it by itself, and then the intensity is so much less. We say that it varies *inversely* as the square of the distance. If it varied *directly*, then the light would be sixteen times as bright, when the distance was four times as great, instead of being one-sixteenth as bright. This "law of inverse squares" is true for the intensity of light, sound, magnetism, heat, and gravitation.

WHY DO WE HEAR THINGS MORE PLAINLY BY NIGHT THAN BY DAY?

There are more reasons than one for this. The first is that there are fewer noises at night, and so those we do hear are better and more distinctly heard, since they are not confused with others in the air, and also since they are not confused with others in our ears. A second reason is, I think, that our ears are usually much more sensitive at night, so that we hear things much better. I don't mean, of course, that our ears are more sensitive when we are asleep, but that when we are just awakened, or when we are just going off to sleep, our ears are specially acute.

The same thing is true of the ears of anyone who is taking chloroform or ether for a surgical operation. Thus, two sounds which, measured by some lifeless machine, are of exactly the same loudness, will sound very different to our ears according to whether we hear them in our ordinary wide-awake state, or at night when we are half asleep, or when we have been suddenly awakened and are straining our ears to hear. This straining is a real thing. We tighten the drums of our ears, so that they vibrate better to sound, and so we actually hear more loudly.

It may also be that in some states the night air may conduct sound-waves better than in the daytime.

HOW CAN PEOPLE FORETELL THE WEATHER?

Though people who foretell the weather are sometimes wrong, and though we usually remember when they are wrong and forget when they are right, yet it is true that people *can* foretell the weather, and that those who do it best are much oftener right than wrong. One way of foretelling the weather is simply by noticing what has happened before, without any attempt to explain why. We all know the lines which say that

> A red sky at night is the shepherd's delight,
> A red sky in the morning is the shepherd's warning.

These lines express what most of us know by experience. Many people who notice this kind of thing may be more or less weather-wise, though they know nothing at all about what makes the weather; but they will be very often wrong.

The scientific way of foretelling the weather depends on our understanding the causes of it. We know, for instance, that when the air in a place is less dense than usual, which we mean when we say that the atmospheric pressure is low, there is likely to be wind coming in from parts round about to fill the space which is comparatively empty of air; and this wind, if it comes from the direction of the sea, will probably bring rain with it, or if from a colder region, will bring cold. So the barometer, which tells us the pressure of the atmosphere, helps us, at the same time, to foretell the weather.

IS THERE A NAME FOR THE SCIENCE OF THE WEATHER?

We know that the names of sciences often end in -logy, since *logos* is the Greek word for a discourse about anything. Thus, we have such words as *geology*, the study or discourse of the earth; *biology*, the study of life, and so on. We also have the word *meteorology*, for the science of the weather, and there is in the United States a Weather Bureau, where people study the weather, and from which come the forecasts we see every day in the newspapers.

Of course, the barometer is one of the chief instruments used at this office; but the office is much helped nowadays by the telegraph, and even by ocean cables and wireless telegraphy. By these means we can know in advance what is happening over, say, the Atlantic Ocean, and can foretell the weather because we know that certain changes in the pressure of the air are traveling in our direction. Sometimes we find places in the air where the pressure is high, and lower round

them, or places where the pressure is low, and higher round them, and these cyclones and anticyclones, as they are called, travel over the surface of the earth, and bring changes of weather with them.

WHY DOES A WET PLATE GET DRY IF WE LEAVE IT ALONE?

This is due simply to what we call the *evaporation* of water, and the great fact about this is that it occurs at all temperatures. It is true that on a hot day, or when put before a fire, a plate may get dry much more quickly than otherwise, but water everywhere *evaporates* at all temperatures, though the rate varies according to the amount of water already present in the atmosphere. It is that, and not the temperature, that counts. Sometimes, whatever the temperature, we may find that the wet plate does *not* get dry when we leave it, and even that dry things get damp. Matches will not strike, we find, and writing-paper is quite moist. In such cases the air has been holding more water than it needed, and has deposited it on everything exposed to it. That, of course, is what happens when the dew falls, and if you laid a wet plate on the grass in the evening, you would certainly not find that it became dry, but wetter.

WHY DO ROUGH WAVES BECOME CALM WHEN OIL IS THROWN ON THEM?

We must not think that we can abolish waves altogether by throwing oil upon them. The waves, driven by the wind, will go on as they did before, but it is just the surface of the water, including the waves, that is affected by the oil. The oil is lighter than water, and floats on its surface. Though it is lighter, yet it is a very different kind of liquid, and the molecules making it up are much more closely attached to each other than the molecules of water are. We have a special word for this difference in liquids. We say that some are more *mobile* than others, which simply means that they are more movable; and we say that some are more *viscous* than others, which simply means that they are more sticky. Water is very mobile, though not quite so mobile as some liquids, such as "sulphuric ether," which is used for sending people to sleep; and oil, on the other hand, is very viscous. A mobile liquid, when it is shaken, readily breaks into drops, and so forms spray; but you can scarcely make a spray of oil, whatever you do to it. So, by pouring a layer of the very viscous liquid oil on the mobile liquid water, we stop the spray, though we do not stop the waves, and we prevent the waves breaking, as they would otherwise do, against the sides of the ship. This may be well worth while, as it may mean that only a very little water, or none at all, is brought aboard, where, before, every wave was breaking and threatening to waterlog the ship.

WHEN WATER IS PUT ON AN OILY PLATE, WHAT CAUSES IT TO GO INTO BEADS?

We all know that water and oil will not mix together. The reason for this is that the molecules of the water, and the molecules of the oil, hold very much more firmly to each other than they do to molecules of the other kind. This holding together is very weak, comparatively, in the case of a mobile fluid like water, and so, when it has a chance, it flows very easily and widely over any surface that it may be upon. But if the surface happens to be covered with oil, the water cannot do this. Perhaps it might if water were lighter than oil, but it is heavier, and so everywhere the oil tends to rise above the water, and breaks it up into a number of little drops or beads, which cannot spread themselves out, because they cannot break through the ring of oil molecules which surrounds them, holding each other's hands very tightly, as it were.

WHY DO OUR FACES KEEP WARM WITHOUT CLOTHES?

The answer to this very interesting question is that it is all a matter of custom. Our faces, exposed to cold, *do* get cold, as we could show at once by placing what is called a "surface thermometer" on them; but they do not *feel* cold, because the nerves by which we feel cold are accustomed to this state of things, and take no notice of it. It is true of all nerves that they only notice differences from what they are accustomed to. We tolerate, without noticing them, degrees of cold to which we are accustomed in our face and hands; but we feel our feet cold, and may even "catch cold," if we expose them. But people who are accustomed to bare feet feel no more, and suffer no more, from them than we do from bare hands. On a winter day we may not notice that our

noses and ear-tips are cold, but they *are* cold, though we feel nothing. You soon find that, if you put a warm hand against them; and the other proof is that they are very apt to get frost-bitten in cold climates. There is all the difference between *being* cold and *feeling* cold.

This law about custom, and the way in which nerves are affected by it, is one of the most important in the world, for it explains the way in which we learn to get accustomed to all manner of things, and it tells us why the countryman cannot at first sleep in the city on account of the noise, while the townsman often cannot sleep in the country on account of the silence. At last, however, the countryman gets used to the noise, and the townsman gets used to the silence, and both sleep soundly and well. All we really feel is *difference.*

HOW DID THE GAS GET INTO THE COAL?

When we look at a dry, firm lump of coal, it does not look as if it contained any gas, for there are no visible spaces for the gas to be in; nor does it look at all oily. These things do not exist in the coal before something is done to it. We say that coal is mainly made of carbon, but a great deal of this carbon is combined in it with other elements, such as hydrogen. Coke is much more nearly pure carbon than coal is. When coal is heated it is greatly changed, partly by the heat and partly by its being burned, and then the gases are *made* which we can separate and burn, and which give its cheerful flames to an ordinary coal fire.

WHAT IS IT THAT MAKES COAL BURN?

Coal burns, as other things do, by combining with oxygen. In order to do this, it must be hot; and so we have to make it hot before it will burn. But when once it has started to burn, it produces so much heat and makes itself so hot that it will go on burning. A single piece of coal that has fallen out of the grate will not go on burning. It is exposed to the cool air on all sides, and loses the heat it makes so quickly that it soon falls below the temperature at which the burnable things in coal will combine with oxygen, and so after a time it grows dark and stops burning. Coal will only burn in an ordinary fire, because the lumps lie close together and keep each other warm enough.

The burnable things in coal are very numerous and we do not know nearly all of them. If we consider that coal is the remains of living creatures, and if we remember how infinitely complicated is the chemistry of living creatures, we shall understand how complicated the chemistry of coal must be. But at any rate we know thoroughly one part of its chemistry, and that is that practically only two elements are responsible for the burning of coal and for the making of the endless compounds which it contains; the elements are known as carbon and hydrogen.

WHAT ARE ASHES MADE OF?

We know that, however thoroughly we burn a piece of coal, and however good the coal is, there is a certain proportion of it which will not burn, but drops to the bottom of the fire, and has to be raked out afterwards. We throw these ashes away and think of them as useless. But they contain all sorts of very valuable salts. We have heard of potash, a compound of the element which was found a century ago and called *potassium.* Well, potash is really pot-ashes, and this tells us something about the composition of ashes. The plant body from which coal is made contains many salts, just as our own bodies do, and these salts—salts of potassium and other metals, such as *sodium*—are already burned, or oxidized. That is why they cannot be burned any more in the fire, and fall to the bottom, instead of going up the chimney in the form of gases. These ashes are really very valuable as food for plants, or manure, for they contain the very salts that present-day plants need for their lives, and must get from the ground if they are to live.

If our own bodies were burned we should find ashes left, just as when coal is burned, and these ashes would be very similar in most ways to the coal-ashes.

WHAT IS THE USE OF COAL-TAR?

Besides gas and ashes, we can get out of coal the stuff we call tar or coal-tar, and this has all sorts of remarkable uses. It is one of the most complicated things in the world, outside the realm of living things, and it is so, just because it is really the product of living things of long ago. Nothing could be uglier or less

interesting to look at, yet it is the source of some of the most exquisite colors in the world. All sorts of beautiful dyes, used for clothes and many other things, such as painting, are made from coal-tar. The great discovery of the first of these, called mauve, and of many more, was made by an Englishman named Perkin, who died some time ago. But science has never been properly studied or appreciated in England, and so now we get nearly all our coal-tar dyes from Germany, where Perkin's work has been carried much further.

But we get still more useful things from coal-tar, for it contains substances which can be made into all sorts of medicines, and especially such things as carbolic acid, which kills microbes, and has already saved millions of human lives since its use was discovered by Lord Lister. Indeed, it would be quite easy to write a book about coal-tar, which is now known as one of the most valuable things in the world, though until last century it was looked upon as little more than mere worthless waste.

WHAT IS A CONSTELLATION?

Stella is Latin for a star—as every little girl named Stella knows very well, of course—and *con* simply means with or together. So the constellations are the groups or families of stars that we seem to see in various parts of the sky. I say "seem to see," for as a rule there is no reason to think that the stars which seem so near together are really near at all. Of two stars seen side by side, one may be a hundred times as far away as the other. But these groups of stars or constellations, like what we now call the Dipper, are even more impressive and noteworthy than any single star; and so, in many cases, the names of the constellations may be older even than the names of the stars which go to make them up.

But there is one very special reason why the constellations have been studied and watched by men for countless ages. It is because they thought that the constellations all had special meanings for the lives and happiness of men. The same was thought of the planets. So when a certain planet seemed to be passing or wandering—you remember that planet means wanderer—through a certain constellation at the exact time when a child was born, it was thought that, all its life, the child would be affected by the planet. One thing—perhaps something nice—would happen when this particular planet was passing through one constellation, and another thing—perhaps even a great risk of death or injury—would happen when the planet was in another constellation. We now know that all this is false, and the very worst kind of lies; for it led people to trust and believe in things that had nothing to do with them, instead of remembering that God rules all, and that the way to be happy is to do the right and leave the rest to Him.

HOW DO WE KNOW THAT THE EARTH IS IN MOTION?

Not long ago there was found a new way of showing that the earth is in motion—by setting something spinning, like a top, and showing that it seems to change the direction of its spin in a way which can only mean that the earth on which it spins is itself spinning. But it was known that the earth is in motion long before this way of showing it was found. We know that the earth is moving just as we know that the smoothest train is moving—by the fact that other things beside it seem to move. In the case of the train these other things are the telegraph-poles, fields and fences; in the case of the earth the other things are the sun and moon and stars, and even comets, when there are comets to be seen. All the heavenly bodies, without exception, seem to rise in the east, move over the face of the sky, as we say, and set in the west. It is quite impossible that this can mean anything else but that the earth is spinning towards the sun, moon, and stars as they seem to rise, and spinning round away from them as they seem to set.

DO ALL THINGS MOVE IN SPACE?

Of course, the sun and the moon, and even, as we now know, what used to be called the "fixed stars," have motions of their own—their *proper* motions, as they are called, proper really meaning "belonging to"; but the motion which proves that the earth is moving is called their *apparent* motion, for it only seems or appears. The earth is moving, and not they. The marks of this motion are that it is *common* to *all* the heavenly

bodies, though their own or proper motions may all be quite different from each other; and that it is daily, or *diurnal*, which is Latin for daily. The best proof of the earth's motion, then, is the *common, apparent, diurnal* motion of the heavenly bodies, which can only mean that the earth spins right round on itself once a day; just as the best proof of a train's motion is the *common, apparent* motion of everything on both sides of it—common, or shared in by all objects, even though these may include cows or horses running in opposite directions to each other. That, of course, is their own or *proper* motion. Everything moves.

WHAT MAKES BRASS WARM WHEN WE RUB IT AGAINST WOOD?

The Latin name for rubbing is friction, and by that word we now mean everything that happens when one thing is rubbed against another. There may be friction between the outside of one thing and the inside of another; or inside something, as when water is shaken and the molecules rub against one another. If we prevent the heat of the water leaking away, we can actually make cold water boil simply by stirring it.

Now, heat is really a special kind of motion—a special motion of the atoms or molecules of any kind of matter. If we remember this, the rest is easy to understand. For nothing is commoner or simpler than the change of one kind of motion into another. Whenever you throw a ball, the motion of the fibres of your muscles, as they shorten, is changed into the motion of the ball. When steam drives an engine, the motion of the molecules of the hot steam is converted into the motion of the wheels—while the steam loses its heat.

And just as heat can be converted into the visible motion of an engine, so visible motion of any kind can be converted into the special kind of motion called heat, which is exactly what happens when we rub brass against wood. The point is that nothing comes from nothing; if the motion we call heat appears, then the visible motion of the rubbing must disappear. And the harder you rub, the greater the heat. If there is no friction, or very little, as when something slides very smoothly on glass or ice, you will get no heat, or very little, *just because* you lose no visible motion, or very little. That is to say, the whole of your energy, or nearly the whole of it, is changed into visible motion, so that none is left to make heat. Exactly in so far as the wood stops the motion of the brass, so far do the brass, and the wood, get hot.

WHERE DOES A COLD COME FROM, AND WHERE DOES IT GO?

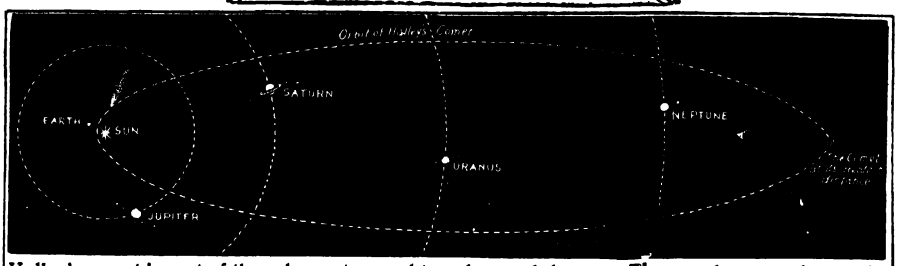
A cold is due to microbes that attack our nose and throat, and in bad colds even our upper air-passages. The microbes probably come from someone else who has a cold almost in every case. We do not know whether the cold-microbe lives anywhere except in the throats and noses of human beings. If it does, perhaps a cold may come from the soil, or wherever it is that the microbe lives; but usually the answer to the first half of the question is that the cold comes from someone else. Unfortunately, he is none the better for having given it to you. The answer to the second half of the question is that, so far as we are concerned, the cold ends because, after a few days, our bodies learn how to deal with the microbes, so that they are either killed, or else can do us no further harm, and so we recover. But the cold may often go to other people, just as it came to us.

HOW DO WE GIVE ONE ANOTHER COLDS?

We give one another colds in many ways, the result of all of them being that we pass our cold-microbes on to others. I do not think, added the Wise Man, that people are nearly careful enough about safeguarding other people when they have colds. Doubtless the other people are just as careless as the person who has the cold; but, at least, if we do not keep ourselves away from company, we should be careful about not coughing or sneezing or even speaking opposite the faces of other people else we may give them our cold.

Also, the time will probably come when people who have colds, and diseases a thousand times more serious than any cold, will not be allowed to send handkerchiefs to the laundry, where now women daily catch all sorts of diseases from the clothes they wash, which have come from many different homes where there are sickness and disease.

THE NEXT QUESTIONS BEGIN ON PAGE 2651.



Halley's comet is part of the solar system and travels round the sun. The sun, however, is not the centre of this comet's path, but is at one end, as shown here. The comet comes within our sight about every seventy-five years, and then rushes away till it is 3,200 millions of miles from the sun.

COMETS, METEORS, & SKY DUST

CONTINUED FROM 2394

MOST people have got into the way of thinking that space is quite empty between the stars, and that the solar system is quite empty between the planets; and so we speak of "empty space." We do not, of course, mean really empty, but we mean empty of everything but the ether, which is everywhere. But now we are beginning to learn that space is by no means so thinly inhabited as we used to think.

It is probable that if we could travel from the earth to Mars we should find ourselves almost constantly encountering matter of one kind and another, and so, in order to complete our study of the solar system, we must take into account various things which are part of it, but which are very different from either the sun, or the planets, or the moons of the planets. The most remarkable are the comets. After studying them we must learn about the meteors, and also about the dusty stuff which exists in space, and is usually known to astronomers as cosmic dust. But the great point we are to be certain of, from the first, is that these different things are not quite independent of each other, but that if we could trace the history of a speck of matter from age to age we should probably find it at one time making part of a comet, at another time part of a meteor, and perhaps, last of all, as part of the cosmic dust or sky dust, about which astronomers are just beginning to learn.

Let us now begin with the comets. It is generally supposed that there are two classes of comets—those which go regularly round the sun, just as we do, and those which visit the sun, apparently once only, and then fly away for ever into the depths of space from which they came. We may possibly learn soon, however, that in reality even these last comets will return; and all we can say at present is that the more we study the comets, the more likely does it appear that all the comets we can see will some day be proved to be parts of the solar system, going round the sun as the earth does.

When we look at an ordinary comet, we may perhaps see only something bright, which might, for all we know, be simply a star. But if the comet is large and very near, or if we look at it through a telescope, we see at once that it is not a star. There is no mistaking it for anything but what it is, for no planet or star or moon or nebula has the same appearance.

The pictures on page 2545 show us that a comet has three parts; it has a head with a very bright spot in the centre, and around it a sort of cloud which perhaps looks a little like glowing hair. The word comet is derived from the Greek word *kome*, which means hair. The central and brightest part of the comet is called the nucleus—a word which we may remember because it is also the name for the central part of a living cell.

A comet always has a nucleus with the misty stuff round it, and there is no doubt that this stuff is given out from the nucleus, which is a very hot and very active place—at any rate, when the comet is near the sun.

The thing we always think of, however, in connection with a comet is its tail; and it is true that most comets, when we can see them, have tails. The tail may be long or short; it may be a single tail, or it may break up into a sort of brush. If we watch a comet that has several tails, we may find them changing very much, almost from day to day; sometimes they may disappear, and then after a while new tails, or a new tail, will form.

HOW THE SUN DRIVES THE COMET'S TAIL OUT OF ITS HEAD

We are at last beginning to understand what the tail of a comet is. It is best thought of as a streamer, or a number of streamers, flowing out from a head; and we shall have the key to the making of the comet's tail if we study its history in the various stages of a comet's course. The rule is that when a comet is far from the sun it has no tail. The path of a comet round the sun is much more elliptical—like this ⬭—than that of any planet, and at its farthest from the sun the comet goes out far beyond Neptune. Suppose, now, that we on the earth are watching a comet coming back towards the sun after its long journey into the cold. We know it for a comet by the appearance of its head and by its movement, and perhaps by the fact that it was expected. But when we first see it, it has no tail; then gradually, as it approaches the sun, a tail streams out behind it, and the nearer it is to the sun the bigger is the tail. At last the time comes when the comet has to go round the sun, and then it will begin to go back to the depths of the space from which it has come. At this time it is moving very quickly, for if it were not the sun would certainly capture it altogether by the force of gravitation.

THE COMET LEAVES THE SUN LIKE A LADY LEAVING ROYALTY

And now we notice that the tail of the comet, which streamed behind it as it approached the sun, is always seen on the side of the comet away from the sun; and as the comet leaves the sun, the tail is now the leading part of the comet. The comet leaves the sun like a lady leaving the presence of Royalty—the train of her dress going first, and then the lady herself.

Now, all this plainly means that the tail is something which is pushed out from the head of the comet by the sun, so that, wherever the comet is in relation to the sun, whether it is going towards the sun or away from the sun, the part of the comet next the sun is always the head, and the part of the comet farthest from the sun is always the tail. There is some power in the sun which is able to repel part of the comet when the comet comes near enough. That part which is repelled or pushed back from a comet's head by the sun is the tail. That is why the tail only appears when the comet is near the sun, and that is why the tail behaves in the peculiar way it does.

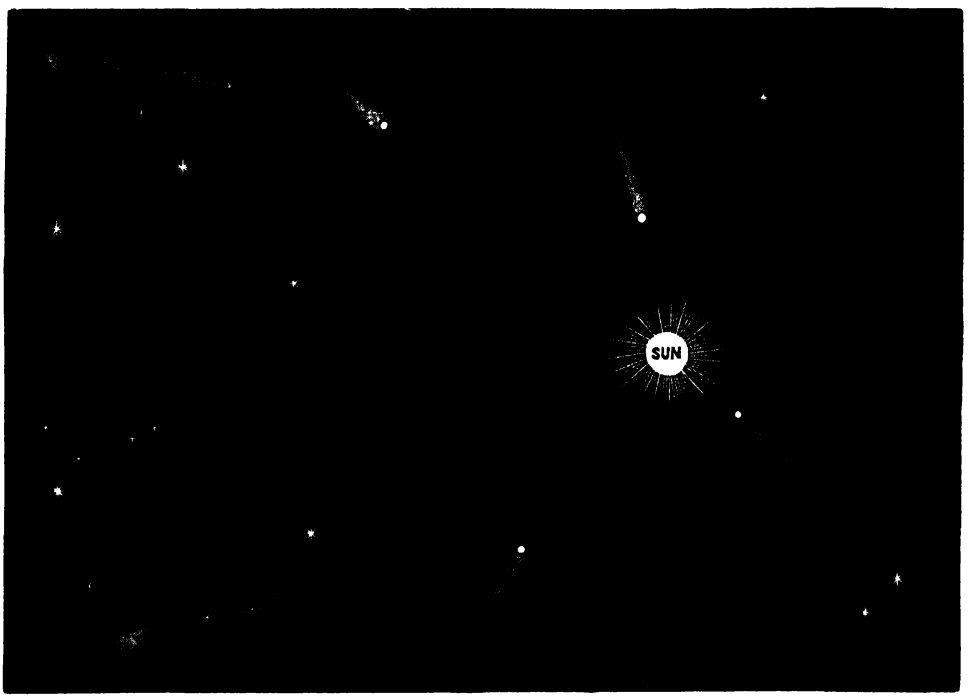
We are to think of a comet's tail as made under the action of two forces. First, there is the nucleus of the comet which is throwing light stuff out from itself. If the comet is far from the sun, that stuff is made very slowly, and simply surrounds the nucleus, forming a sort of fog or hair, which gives the comet its name.

HOW THE COMET LOSES ITS TAIL AND HOW A NEW ONE COMES

But when the comet is near the sun, a second force comes into play, and the matter which is thrown out from the nucleus is now pushed by the sun, always on to the side of the comet farthest from the sun. There was discovered in America in 1908 a very fine comet, which was very carefully photographed again and again at Greenwich, and these photographs have shown more clearly than ever before the truth of what has just been said about a comet's tail. A specially interesting point is that the nucleus of a comet is not equally active at all times, but undergoes changes, just as volcanoes do, and just as the history of sun-spots shows us that the sun himself does. It may even be that the nucleus of a comet becomes regularly more and less active owing to a *cycle* of changes—we now know what that word means—going on inside it. Thus the appearance of a comet may change from day to day or week to week, and as it is certain that a comet's tail may sometimes get broken off, and scattered into space, days may pass during which the comet seems to have lost its tail, because,

perhaps, just then the nucleus is not throwing off much new matter. And then a new tail will "grow," that is to say, the nucleus begins to explode again, and the repelling power of the sun drives the exploded stuff out into a streamer, which we call the comet's tail.

Now, we have heard again and again of the attractive force of the sun, which we call gravitation, and suddenly we are told that the sun has a repelling force—something which acts in exactly the opposite direction to its force of attraction. I am sure that if you are thinking carefully you will say that there has been some mistake, or if there has been no mistake there is, at any rate, something which needs to be explained. Now, it has lately been shown that light, as it flies out from anywhere, has a pushing power, and it is possible, by a very delicate experiment, to show that a flash of light will push down one end of a balance. Not only light, but other kinds of rays, such as heat rays, have this power of pushing or pressing, and so it is called "radiation pressure." It is this light-pressure, or radiation pressure, that makes the tails of comets, and explains why the tail appears when the comet gets near the sun, and why it is always on the side away from the sun. We believe that it is the very lightest atoms in the comet that are pressed or blown away by the light from the sun. We need not say more about that here, but I particularly want you to remember that sometimes the matter which is blown out from a comet's head may break away from the comet altogether. This has long been suspected, but I do not think that it had been proved until the photographs were taken at Greenwich in 1908, which showed that it actually happens. *We shall hear again of these broken-off pieces.*



When a comet first comes within sight of the earth it appears as a patch of light. Then, as it gets nearer to the sun, it begins to have a tail, or stream of light, which is always turned away from the sun. This picture shows a comet traveling round the sun, and we can see how it appears at different stages of its journey. As it goes away from the sun it pushes its train backwards, like a lady leaving the presence of Royalty.

By far the most famous of all comets is one which is known by the name of the great astronomer Halley. A comet had been seen by Kepler in 1607, and a comet which Halley saw in 1682 seemed to be in the same position. Halley argued that it must be the same comet, traveling round the sun once in every seventy-five years, and he proved his case. This was the first time that this revolution round the sun was proved for any comet. He found that just about

seventy-five years before 1607, a comet had been seen, and seventy-five years before that—in 1456—a comet had been seen which had terrified the world—terrified it so much that the pope ordered prayers to be offered for protection against it. This same comet returned in 1910, but was a great disappointment, for it was so small and so insignificant that even the most ignorant and superstitious were not in the least frightened by it.

Halley predicted that the comet would return again about 1758. Later it was calculated that Jupiter and Saturn, by their gravitation, would slightly delay the comet, so that it was expected in 1759, and it came in that year. So it did in 1835. Now, seventy-five years from 1835 brings us to 1910.

Great interest was manifested on its approach. Astronomers all over the world had their telescopes ready to take photographs of the rare visitor. All were anxious to be the first to discover its coming, and astronomers hoped to be able to discover more of its composition than could be found out by the crude instruments which had been in use seventy-five years previously. As has been explained to you elsewhere, we can tell by a ray of light what elements are present.

THE COMET SEEN AT THE NORMAN CONQUEST WHICH WAS SEEN AGAIN

We need not be told that, since the year 1835, the science of astronomy has advanced enormously. We were able to learn things about Halley's comet, when it returned, which Kepler or Halley or the astronomers in 1835 would never have thought possible. We were able, for instance, to learn a great deal about the very chemical elements of which the comet is made.

We have already learned that a comet may lose part of itself, and, indeed, it is probable that the life of comets, so to speak, is not nearly so long as the life of a star or even a planet. They are apt to break up. When Halley's comet was last seen, it was very much smaller than it had been before, and it was smaller still this time. There is a famous tapestry, called the Bayeux tapestry, which shows the comet as it appeared in the year 1066, the year of the Norman Conquest. I think we may be sure from that tapestry that the comet was then even larger than it was when it frightened the world nearly 400 years later.

THE STORY OF MANKIND IS NOT YET AS LONG AS A COMET'S YEAR

To judge by the length of our little lives, seventy-five years is a very long time, but there can be no doubt that there are many comets which have a far longer period, as it is called, than this. There are comets which only return to the neighborhood of the sun in thousands or even hundreds of thousands of years—that is to say, their year is as long as hundreds of thousands of our years.

Now, recorded human history only goes back for about 10,000 years, and the real length of the life of mankind upon the earth cannot yet be as much as 500,000 years. So the path of these comets gives us a new kind of scale by which to measure time, and makes our little "history periods" seem very short. We might think at first that, surely if a comet travels out so far from the sun as these tremendous periods of time suggest, it must encounter another star, and come under the influence of its gravitation. But the sun and the solar system are very much alone in space. The nearest fixed star is 20 millions of millions of miles away, and so there is plenty of room, so to speak, for a comet to travel out tremendous distances without getting within reach of any power that can draw it away from the sun for ever.

IF A COMET'S TAIL SHOULD STRIKE AGAINST THE EARTH

We may also ask whether the life of a comet can last long enough for these periods, as we know that comets are apt to break up. But it is probable that their breaking up largely depends upon light-pressure and upon the sun's heat, which only act when they are comparatively near to the sun, and therefore, of course, when comparatively near to us. When the comet is pursuing its path far away in space, there is probably no reason at all why it should break up.

It has been supposed that a comet, or the tail of a comet, might strike the earth, and that if this happened the earth might be destroyed. But there is reason to believe that the tail of a comet

has touched the earth without anything terrible happening. The truth is that the tail of a comet is made of such very fine and rare stuff that it can do no harm. One proof of the rareness of a comet's tail is that the stars can quite plainly be seen through it. But it may be that the stuff in a comet's tail may condense, when it has broken off from the comet and is becoming cold. At any rate, we are not to think of a comet as a solid thing, but as made up of tiny parts, and largely consisting of gases. Up to the present the study of the light coming from comets shows us that they contain carbon and hydrogen, probably in the form of compounds belonging to the class of hydro-carbons, which we have already studied, and of which marsh-gas is an instance. It is probable that the things we see going on in the head of a comet when it is near the sun are due to the comet being heated by the sun, and gases being thus made to come out of the nucleus; then the pressure of light acts on them and produces the comet's tail.



THE COMET OF 1744



THE COMET OF 1858



THE COMET OF 1861



THE GREAT COMET OF 1882

The brightest and biggest comets can be seen plainly without the aid of a telescope. Here are pictures of four important ones, from which we see that they vary greatly in shape. Their tails and streamers change from time to time, getting bigger as they approach the sun, and smaller as they travel from it. The tails of some comets are a hundred million miles long, greater than the distance from the earth to the sun.

Now we must go on to the study of meteors, but we shall find that we have not really left the subject of comets after all. The ordinary name for meteors or meteorites is shooting stars. Of course, we must get out of our heads once and for all anything that the word "star" suggests to us in this phrase. I have known a young child to be terribly frightened by supposing that a meteor was a falling star which had suddenly shot out of its place in the sky and was going to strike and destroy the earth. A so-called falling star or shooting star is no more a star than a bit of coal is. But the name tells us that long ago meteors were thought to be stars; but that was when no one guessed that the stars are suns, nor was it known then that the little lumps of iron sometimes found in the ground are all that is left of meteors. Meteors fall in greater numbers at special times of the year, and also in special years. On some nights in November in certain years we may see hundreds falling. We must remember also that they are

falling all the time, more or less, only, of course, we do not notice them in the daytime any more than we notice the stars themselves.

It is only about a hundred years since we have known what meteors are. The space between the planets and the solar system is largely filled with large and small portions of matter. The earth with its atmosphere as it travels acts like a sort of tremendous attractive filter, pulling many of these things towards itself and catching them. Until they meet the earth's air they are cold and invisible, but when they rush through the air—perhaps at the rate of thirty or forty miles a second—they are made intensely hot and brilliant, especially as the oxygen of the air begins to burn them.



This great meteorite, weighing nearly 1,400 pounds, fell from the sky upon the Alps, and after being used as a seat in a church porch was taken to the Paris Museum. It is called the Caille aerolite, and is one of the largest of the known meteors.

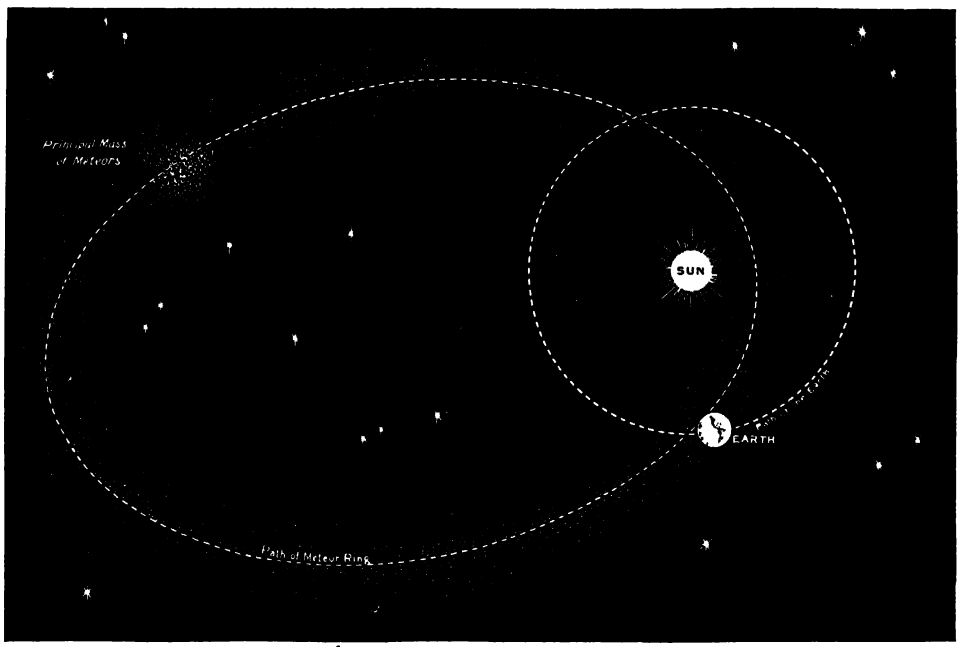
In this way, by far the greater number of meteors are turned into gas; and so, though the matter in them remains as part of our atmosphere, they never strike the solid or liquid surface of the earth at all. What we usually see is the streak of light produced for a moment as the little speck of stuff plunges into the upper regions of the air and is burnt away. Sometimes the track remains bright for a little while, and we suppose that the meteor sheds part of itself as it flies, and that the stuff which was shed glows for a second after the meteor itself has passed.

But not a few times every year the earth catches a meteor so big that it is not all burnt away before it reaches the ground. It is recorded that once a man was killed by the fall of such a meteor. These meteors are to be seen in museums, and, if we consider where they have come from, they are surely very interesting. They are not made of anything new and different from what we find on the earth, but of elements which we know well. Of these the commonest is iron. Probably before they fell they had a good deal of carbon in them, but that has been burnt away as they rushed through the air. The surface of a meteor usually shows signs of having been melted. That, of course, we should expect.

Now let us consider the showers of meteors that we see at regular times. The November shower, for instance, is specially brilliant, and the numbers are specially large, not only in November as distinguished from the rest of the year, but also in certain Novembers, just about thirty-three years apart. We have records of these great showers occurring about three times in a century for a long time back. The earliest record dates from just the end of the sixth century A.D. We have now learnt that these meteors are traveling in a path round the sun, just as the earth is, but that is not all. There is a comet which travels in the same path. Other shoals of meteors travel round the sun, and comets also in the same paths. We have even some evidence that in the path where a comet once traveled there is now no comet left at all, but only a shoal of meteors. What we now believe is "that the countless thousands of comets which in time past have coursed around the sun have left behind minute fragments of their mass, which follow in their orbits like stragglers from an army, and that, when the earth encounters a swarm of these fragments, a meteoric shower is produced." These words are quoted from one of the greatest authorities on the subject. Since they were written, a few years ago, our proofs are increasing, and if you remember what was said about the principal comet of 1908, you will see how interested astronomers must be to learn that the tail of a comet may be broken off. We know now what is going to happen to that tail. Almost certainly it is going to condense into a shoal of meteorites, and perhaps some of these may some day be caught by the earth.

We may ask how it is that the November shower, for instance, returns more

or less every November, but especially every thirty-third or thirty-fourth November. The diagram on this page helps to explain that. It shows us the path of the meteors, and we see that it is like a comet's path. Once a year, plainly, as, for instance, every November, the earth crosses this path and catches a few meteors. But once in thirty-three years it catches a great many. The reason must be that when the comet broke up, or when part of it broke up, and the meteors were formed, most of them stayed together in a sort of group, but some would, perhaps, move a little faster, and others a little slower, moving in the same path, but more sparsely scattered. The great shower is when the earth crosses the meteors' path just at the time when the great body of meteors is passing.



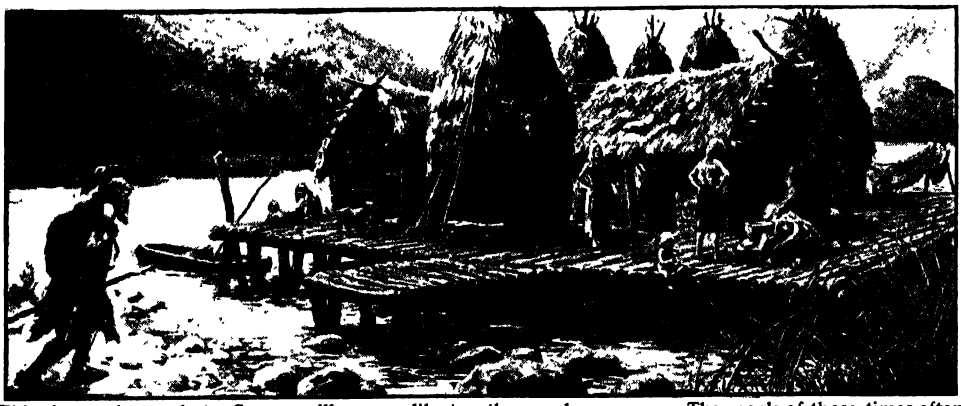
Those bright flashes across the sky that we call shooting stars are not stars. They are believed to be pieces of a broken-up comet, and they travel round the sun in a regular path. This diagram shows how the earth every year crosses the path of the meteors, and as the meteors rush through our atmosphere they become white-hot, and look like shooting stars. Where the head of the comet used to be, there are more meteors than elsewhere, and when the earth crosses this part of the meteors' path we see more meteors than usual.

Though falling "stars" are utterly tiny compared with a real star, or even compared with a little body like the moon, yet they may be the size of a big cannon-ball, or even, perhaps, a quite large piece of rock. It is probable, however, that space contains a great quantity of stuff made up of much smaller pieces, more like the dust we see in the air when a sunbeam strikes across a room. Cosmos is the Greek word for the universe, and so this stuff is usually called cosmic dust, but if that word is, perhaps, rather difficult, we may just as well call it sky dust. Some sky dust, like meteors, is, perhaps, the remains of comets, but not nearly all of it can have this origin—there is far too much of it. The earth catches certain quantities of it always as it travels—the earth filters some of the sky dust out of the ether, we may say. We know very little yet about the history of this stuff. We may suppose that it was, so to say, left over when the planets were being made out of our nebula long ago. But we know so little about it yet that we need say no more about it here.

Now we have finished our story of the solar system. We began with the sun, and we have ended with dust. After this we must turn to the real stars, about which we have already learned the greatest fact, namely, that they are suns and have systems of planets like our own revolving about them.

THE NEXT PART OF THIS IS ON PAGE 2637.

GERMAN HOMES OF LONG AGO



This picture shows what a German village was like two thousand years ago. The people of those times often built their homes on wooden platforms in the middle of lakes, so that enemies could not reach them easily.



The Germans first appeared in history as great warriors and huntsmen, and to make themselves look fierce they decorated their heads with the heads and horns of wild animals. Here we are looking inside a German home of long ago, and we see the men of the family arriving home with a bear. The boy standing up is dressed in an animal's skin. Rough as they were, the German tribes treated their women with great honor.



THE BEGINNINGS OF GERMANY

CONTINUED FROM 2426

WHEN we read of Germany, in the early annals of the Roman Empire, it was inhabited by a number of restless, warlike tribes whom the Celts, and after them the Roman writers, named Germans. They could scarcely be called nomadic, for they cultivated a little of the land, though they lived chiefly on milk and flesh; but they had an unconquerable love of fighting. They had come, probably centuries before,—we cannot tell how few or how many,—from the east, and made their way up the Danube, to the plains in the heart of Europe, pushing the Celts before them as they moved forward on their journey to the west.

The chiefs of their tribes, they thought, were descended from the gods and heroes, and they believed that when they died they joined the heroes in Valhalla, the abode of the gods, where they spent their days in hunting and fighting and their nights in feasting.

Round each chief gathered a band of young men—youths who were sworn to his service, and fought in the vanguard of his battles. The members of this band of youths, which was called the comitatus, as they gained in years, grew to be the most trusted counselors of the chiefs. They were called *thegns* in England when the Angles and Saxons founded a nation there.

When the Romans first met the German tribes they went to battle wearing on their heads the heads of animals, which they afterward changed to helmets; and sheltered themselves from their foes behind tall shields.

They were, of course, pagans when they met the Romans. They worshipped, among other gods, Odin, the father of the gods, and Thor, the god of war, to whom they sacrificed horses and captives taken in war. They worshipped their gods in forests, and under trees, and when they ceased to follow these false gods, and became Christians, they felled the sacred oaks.

Now the country over which the German families had spread, when we first hear of them, is the very heart of Europe, that great middle part which stretches from the Alps to the North and Baltic Seas. A relief map shows us plainly what a sharp contrast exists—not unlike that in France.

Mountains and highlands towards the south gradually slope to the sea on the north, so that a vast plain is formed, well watered by rivers that rise in the heights of Switzerland and Bohemia and flow to the northern seas. On the eastern side of the

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continent were ever constant changes, as other families of nations pressed on from Asia behind, nations of a different stock from the Teutons or Germans. One branch of these is called "Slaves," or "Slavs." In their own language the word means "glorious," but in other tongues it has come to have a very different meaning, because so many men of the race became bondmen.

It was along the Rhine, that great waterway of Europe, that the Romans chiefly came in touch with the German tribes. Julius Cæsar crossed and recrossed it many times when governor of the neighboring country of Gaul. For years the strong nation of Roman soldiers and builders pushed steadily up the long Rhine valley, where the remains of fine cities and forts, splendid roads, and personal belongings exist, as they do in France and England, to this day. They tried to conquer the wild German tribes around, but did not succeed as well as in Gaul and Britain.

HERMANN, WHO TURNED BACK THE ROMAN LEGIONS ON THE BANKS OF THE RHINE

On the top of a hill in the great north plain, about a hundred miles from the Rhine, there stands now a huge statue, over fifty feet high, put up in memory of one of the first German heroes, Hermann, who, in the autumn days of the year 9 A.D., in this neighborhood successfully resisted the dreaded Roman army. When the news of its destruction in the woods and marshes reached the great Emperor Augustus, he clothed himself in mourning and cried out bitterly again and again: "Give me back my legions."

Englishmen take pride in Hermann's stand for freedom, for they trace his bold spirit in the barons who wrung the great charter from John at Runnymede, and in the leaders who defied the tyranny of the Stuarts. For it was from the very region defended by Hermann—in the lands about the rivers Ems, Weser, and Elbe—that their ancestors came later, to found their new Angle-land across the North Sea.

During those centuries the various tribes and families surged like the waves of the sea—a very restless, stormy sea, too—over the face of the land, changing their dwelling-places, fighting with each other and their neighbors, and all these years the great Roman Empire, for a time the ruler of the world, was gradually getting weaker and weaker and less able to hold her own against the on-coming tribes. We remember how the Roman soldiers had to be called home from Britain, then from Gaul. It was a tribe of German stock, the Goths, who appeared at last under the very walls of the great city of the Cæsars, and who finally carried off its treasures, and destroyed many buildings.

ATTILA AND HIS TERRIBLE HOST, WHO SWEPT ACROSS THE RHINE

The Goths had been pushed on by a terrible host from Asia—the Huns. Yellow of face, with wiry hair, and eyes like slits, they seemed horribly ugly to the German races, who saw them sweep across South Germany into Gaul on their swift horses, devastating the country on their way. They crossed the Rhine, and were then stopped on the plain of Chalons, by the River Marne, where the German tribes of the Franks, West Goths, and Burgundians all joined together with the Romans to resist them in furious battle. The "Scourge of God," as Attila the fierce leader of the Huns, was called, was defeated and died soon after. His terrible host departed back into the darkness whence they had come.

We have already seen how the Franks pushed into Gaul, and with the Celts, who inhabited the country first, laid the foundations of the kingdom of France. We have seen, too, how other German tribes, the Angles and part of the Saxons, took ship to Britain. The East and West Goths went to Italy and the south of France; and another tribe, the Longobards, or Lombards, settled in the plain of the north of Italy.

THE NEW INFLUENCE THAT CAME INTO THE WORLD FROM ROME

About these times of great changes there came, in the place of the old force of the arms and grandeur of Rome, a new influence from the same city. It was the spread of the Christian Faith. We know how it spread to England and to France. Missionaries also went bravely and devotedly to work in the wilds of Central Europe, men who were not afraid to pitch idols into the nearest lake, or to chop down sacred trees with their own hands, while the wild heathens stood looking on. Many of these mission-

THE MEN WHO BROKE THE ROMAN POWER



Hermann, who is better known to us by his Latin name of Arminius, is one of the great national heroes of Germany. He defeated the Romans and delivered his country from their rule. Here we see him presenting to the priests of his tribe spoil captured in war. Hermann afterwards was killed by his own people.



The Goths, who were a tribe of German stock, swooped down from their forest homes upon Rome, but later they were followed by still more terrible invaders, the Huns. As these cruel warriors rushed across Europe they burned and destroyed everything before them. This picture shows us the Huns pillaging a villa.

The top picture, which is in Hildesheim Town Hall, is reproduced by permission of the artist, Professor Hermann Prel, and the lower picture, by Georges Rochegrosse, is reproduced by permission of Messrs. Braun, Clement, & Co.

aries were eloquent Irishmen, but it was Rome, hitherto famed for the power of the Cæsars, that was now gaining a new power and greatness as the seat of the Bishop of Rome, the Father of the whole Church, called the pope. Bishops and clergy passed out of Italy over the Alps and the mountains beyond, over the great north plain, over the Rhine valley, to settle and teach. However far they went, they held fast, as it were, to a cord that bound them closely to Rome.

THE LITTLE MAN WITH THE GREAT WILL, AND HIS FAMOUS SON CHARLEMAGNE

Now, when Pepin, the Frank, the little man with the great will, went to keep the Lombards in order out of gratitude to the pope, who had helped him to become king, he took from them the land they owned about Rome, and presented it to the Head of the Church. This was the beginning of the pope's claim to rule over an earthly kingdom.

Pepin's great son, the hero Charlemagne, also helped on the influence of the Church in his enormous dominions We have already seen in the story of France how these included, besides what is now France, Holland and Belgium, Switzerland, North Italy, and part of Spain, as well as nearly all that part of Central Europe we now call Germany. Charlemagne gave many estates in all these countries to the bishops and to monasteries, where the clergy lived together, writing books and teaching in schools More than that, Charlemagne went in person to the rescue of the pope when he was set upon by enemies; so it happened that the great ruler of countries kept Christmas in Rome in the year 800 A.D., and was present at the festival service in St. Peter's.

HOW THE POPE CROWNED THE GREAT EMPEROR IN ST. PETER'S

The pope himself chanted the Mass, and the hearts of the congregation were stirred within them with the grand music and the solemn ceremonial. At the close a great surprize was in store, it is said, even for Charlemagne himself. The pope rose, and taking a splendid crown in his hands, placed it on the king's head, saying: "God grant life and victory to the great Emperor Cæsar Augustus." The soldiers, people, clergy, all burst into loud shouts of delight. Charlemagne was the strong man of the times, and well fitted to defend a new world-wide Roman Empire of all Christendom—later they called it the Holy Roman Empire—in which the pope's power was ever to become greater over the faith of the nations that composed it.

We shall see what a dark shadow was cast over both Germany and Italy by that union, so loudly applauded in St. Peter's that Christmas Day—a shadow not lifted for a thousand years.

We have seen how soon the great empire of Charlemagne fell to pieces, and how France began to take shape under its own line of kings. In Germany it was very different. For centuries the tribes were gradually settling down into practically independent states, loosely held together under the tie of the empire. The rulers of the states had different titles and powers, and the chief ones elected the emperor, with the help of three powerful archbishops.

Looking at the history of these centuries in Germany is like looking into a kaleidoscope, every turn of which, as the years pass, brings fresh combinations and passing changes, as now one state takes the lead, absorbing others or driving them to another part of the country, now another rises into being as others move about or disappear.

THE GHOST OF AN EMPIRE THAT DISTURBED A THOUSAND YEARS

Within 200 years of the death of Charlemagne there were great changes, too, along the eastern borders. The wild Hungarians, of a quite different race from the German families, spread terror over the land. Later they settled down and became part of the empire, though as independent as the rest.

The French writer Voltaire has said that the Holy Roman Empire was neither holy, nor Roman, nor an empire. It has been called a mere spectre or ghost of an empire. But it proved strong enough for a thousand years to hinder German kings giving their best efforts to looking well after their own country, being distracted by the ever-enticing vision of power on the other side of the Alps. Their Italian subjects hated them, and the quarrels that arose between the emperors and the popes were so constant and so fierce and so intricate that a just settlement became more and more impossible as the years dragged on.

TWO FOUNDERS OF GERMAN GREATNESS



The hero-emperor of Germany in the Middle Ages was Frederick Barbarossa, whose name means red beard. He was elected king at a time of unrest, because he was a strong, brave man ; and later the pope crowned him Holy Roman Emperor. The above picture shows Barbarossa being proclaimed king of the Germans.



During the Middle Ages, the knights who lived in the strong castles of Germany became very powerful, and did just as they liked. When Rudolph of Hapsburg, the ancestor of the present Austrian Emperor, was elected Emperor of Germany in 1273, he determined to stop the robberies of these knights and to break their power, and here we see him condemning some robber-knights who have been captured.

Let us see how one of the strongest popes treated one of the weakest emperors. It was about the time when the Conqueror was "settling" England.

The priest Hildebrand had been so popular, toiling with all his might to set right the wrong things in the Church, and to make it strong and pure, that the people of Rome rushed into the church at the funeral of the pope who had just died, shouting: "St. Peter wills Hildebrand to be pope!"

THE COMING OF HILDEBRAND AS POPE GREGORY, AND AN EMPEROR'S QUARREL

The unwise ruler of Germany, Henry IV., defied this new pope, called Gregory VII., and his reforms, appointed bad men to high posts, and finally sent out a message to the world declaring Gregory to be pope no longer. Gregory answered with the terrible punishment of excommunication, which meant that the emperor was put out of the Church, and no priest might minister to him.

After a time Henry gave in and crossed the Alps, and then on to the Apennine Hills, at Canossa, where Gregory was staying, to beg for pardon. It was the depth of winter, and Henry had to wait about for three days in deep snow, barefoot, and in a miserable thin shirt, shivering till the pope chose to see him and forgive him.

Of a very different type was the hero-emperor Barbarossa, Frederick of the Red Beard. His strong, pleasant, smiling face seems to stand out across the centuries, and many are the stories of his bravery and endurance, and how he tried to make the empire complete and independent.

HOW THE QUARREL BETWEEN THE KINGS AND THE POPES ENDED IN VENICE

Five times he crossed the Alps, and had many struggles with the popes. But, strong as he was, he, too, had in the end to give way. In that twelfth century there were violent disputes for ever going on between the Church and the Christian rulers of Europe. In the history of England, we have read, elsewhere, of the tragic death of Thomas à Becket at Canterbury, and the penance of the king. Seven years later, the long contest between the Bishop of Rome and the Emperor of Rome also ended in victory for the Church. The opponents were persuaded to meet together in Venice, the beautiful and independent city at the head of the Adriatic Sea. Three slabs of marble are shown to this day in the porch of St. Mark's—the lovely cathedral shown on page 609—as the spot where the greatest prince of the age, Barbarossa, knelt to kiss the pope's foot, and receive in return the old man's kiss of peace. It must have been a bitter moment for the emperor—Emperor of Rome merely in name, as he said—for the act of submission meant giving up the desire of his life. Later stories, not founded on fact, but due to the imagination of poets and painters, say that the pope set his foot on the neck of the kneeling emperor, saying: "The young lion and the dragon shalt thou trample under foot." In answer, the imperial "footstool" muttered under his red beard: "Not unto thee, but unto St. Peter be this honor." Any way, the tellers of the story understood the strife of the times and the character of Barbarossa.

THE OLD TIMES IN THE OLD TOWNS OF GERMANY

His last effort was to join Richard of the Lion Heart in the Third Crusade to recover Jerusalem from the Moslems. The great emperor was drowned while crossing a river in Asia, and he was buried in the sandy desert. But the old German poets have kept his memory green in song and legend, and the hope lived on that he would come again to help his people in time of need.

In the time of the Crusades the power of the nobles in Germany was very great. They held their lands on the same feudal plan as in France and England, and the peasants were very poor and wretched. Fine towns with strong walls began to rise over the country in order to resist the foes from without, and by degrees churches and universities, good houses and halls, were built, many of which have survived.

Germany to-day is famed for her splendid old towns. Many of the towns bought special privileges and freedom, and some of them became rich and powerful. A large number of these cities, of which the chief were Lübeck, Hamburg, and Bremen, banded together to form the Hanseatic League. They had important settlements in the other countries of North Europe, especially England, Norway, and Russia, and had many special rights which increased their trade and

wealth. The trade of the Baltic was in their hands, and they even made war on their own account, being strong enough to withstand not only the nobles, but pirates at sea and robbers on land.

The robber knights who lived in the castles still crowning many rocky hills were a terrible hindrance to trade and farming in lawless times. The stories of how they sallied forth, attacking merchants at the fords or bridges, and seizing the newly-gathered crops, are most exciting. The knights of the castles were not all robbers, for on them depended the keeping of the roads and the tow-paths, and the entertaining of travelers before there were any inns.

RUDOLPH OF HAPSBURG, WHOSE FAMILY RULED THE EMPIRE 600 YEARS

An emperor who stands out from a time of universal confusion is Rudolph of Hapsburg, who became the founder of the Austrian House of Hapsburgs, in whose family, with some exceptions, the imperial crown remained for about 600 years.

Austria means the East Land, and the duchy gradually grew and spread, with many a change as the kaleidoscope turned, chiefly along the splendid Danube river, which rises near the Rhine in the Black Forest and flows across Bavaria, Austria, and Hungary on its way to the Black Sea. The brave mountaineers of the Alps had to league together against the Hapsburgs, as we learn from the story of Switzerland.

The energetic, intelligent, noble-hearted Maximilian I. was a Hapsburg, and he married the heiress of Burgundy and the Netherlands. Their son became Philip I., King of Spain, as he married the daughter of Ferdinand and Isabella, of whom we read on page 62.

It has been said that Maximilian stands as a boundary stone between the old times and the modern. We have already seen in the story of England and France how everything began to expand and change during this age of Columbus.

THE GREAT PART THAT GERMANY PLAYED IN GREAT WORLD-CHANGES

While the discovery of the compass put into men's hands a guide by which to sail in unknown seas, the invention of printing and the spread of learning made men think and study. Germany has a proud share in this advancement. It was a German who discovered how to make paper out of rags; it was a German who first thought of printing with movable letters; it was a German monk who set all Europe in a blaze by preaching against the Church's wrong-doings.

The emperor at the time was Charles V., the grandson of Maximilian, often called a second Charlemagne, from the greatness of his dominions; for by inheritance he added to the German states, Spain, the south of Italy and Sicily, and the Netherlands, as well as colonies in the New World. It was an empire on which the sun never set. Early in his reign there was a terrible insurrection of the people, called the Peasants' War. They burned castles and monasteries, as did the peasants of France about 300 years later, and for much the same reasons—the grievous and unfair taxes, and the bitter oppression under which they suffered. This war was scarcely over when all Germany was roused by Martin Luther burning publicly the deed of the pope that excommunicated him for his teaching.

Charles V. was against Luther, but many of the princes supported him; and the protest they drew up, saying they could not tolerate in their lands the following of a religion which they held to be against God's Word, gained them the title of Protestants, the name since given to all those who will not accept the authority of the Church of Rome.

THE TERRIBLE STORY OF THE STRUGGLE FOR FREEDOM IN RELIGION

The Germans owe their first popular translation of the Bible in their native tongue to Luther, as we owe ours to Tyndale; and the invention of printing, slowly working from improvement to improvement, made it possible to send it broadcast among the German homes all over the land, in the fine cities, in the beautiful valleys of the hill countries, in the broad north plain.

The story of how religious liberty was gained in France and in Great Britain is sad enough. In Germany, thirty years of war caused unspeakable ruin and misery to the country before people gained the right of following the religion they believed to be the true one. There were the quarrels between Catholics and Protestants, and the quarrels between different kinds of Protestants. The confusion was terrible, because the princes of the various states did their best to insist on their

right to force the people who were subject to them to hold the same religious beliefs that they did themselves. They believed also that the territory over which they ruled was theirs to do with as they pleased—to sell, or leave to their children, or give away. This added to the confusion, for many of the princes divided their territories between their sons, and each division gave a new prince to the empire.

Suppose for a moment that the governor of the state of Texas, or the Province of Manitoba, gained the power to call himself a duke, and that he had the right to divide it among his sons, each of whom would have the right to call himself duke of his own little section, and had power to make what laws he thought best and to make war on his neighbors as he pleased. Then suppose that the same thing had been going on all over the country for a long time, and you can gain some idea of the state of Germany at this time.

In the days of the first emperors, Germany was composed of a small number of large duchies, which practically corresponded to the old tribal lands. By the time of the Reformation, however, the empire had been divided into over three hundred separate states. A few of them were large duchies, but some were no larger than a good sized western ranch. Some of them were towns to which the emperors had given rights of self-government, and some of them were church states, and were governed by bishops, who thought that they owed more allegiance to the Pope than they did to the emperor. Among all these divisions, and warring interests, the emperor, whose power had never been great, could not hold the balance, and enforce peace. The early emperors were strong men, who were able in a measure to hold their own, and as there were large royal domains or state lands which could be made to bring in an income, they could obtain money for their needs.

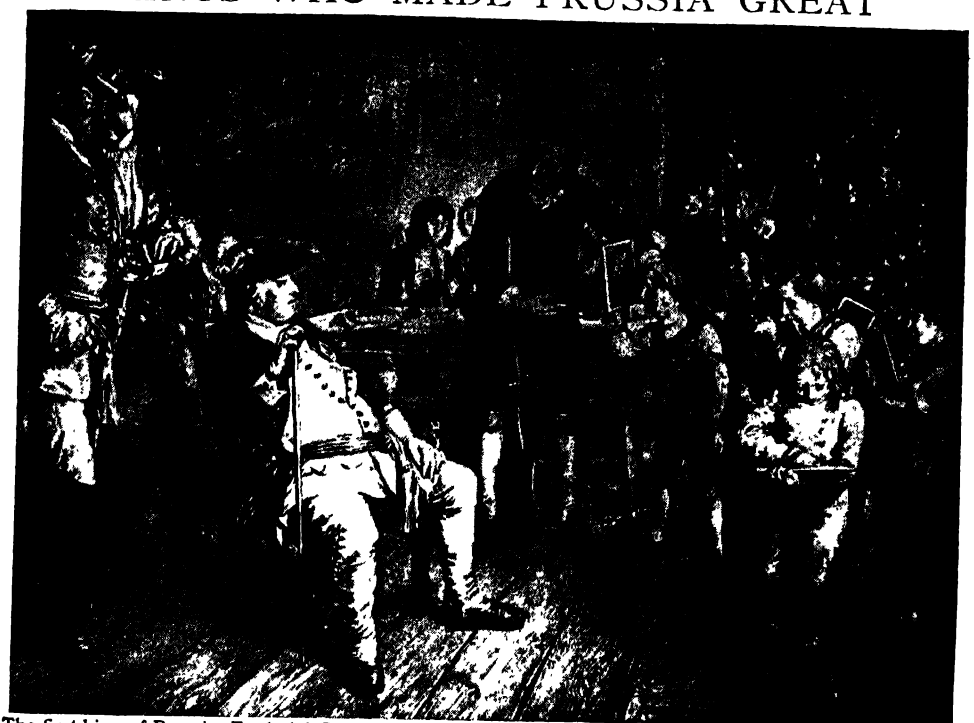
WHY IT WAS THE EMPEROR COULD NOT IMPOSE HIS WILL

But as time went on, not only the domains, but most of the imperial privileges were given away; sometimes in return for aid in time of war, but sometimes as rewards to favorites, or even to pay for support in the election of the emperor's son as King of the Romans, the title which was given to the future emperor. Some of the emperors, too, spent long periods of time in Italy, and then the princes in Germany were able to seize powers, which the emperors could not always get back. Gradually, therefore, it came to pass that the emperor's power became so small that he had little real influence unless he had great dominions of his own. Charles V was powerful, not because he was emperor, but because he ruled Spain and the Netherlands, then the richest and most powerful countries in Europe. But even Charles V was not able to prevent the spread of the Reformation in Germany.

When Luther first preached his doctrines, Charles was engaged in war with the Turks, and with Francis I of France. As soon as he was sufficiently freed from these, however, he attacked the Protestant princes, defeated them in battle, and treated the defeated princes with great severity. Nevertheless, though he had more power than any of the emperors who came after him, Charles had to make concessions, and after much fighting and discussion it was agreed that tolerance should be shown to the Lutheran form of worship. No Lutheran prince was to be interfered with, but it was agreed that the people of each state should profess the same faith as their prince, and no promise of toleration was given to the followers of John Calvin, the French reformer, who preached in Switzerland, and gained many disciples in Germany. These Calvinists were called Presbyterians in Scotland.

Shortly after peace was made, Charles V abdicated the throne and went to live in a Spanish monastery. He had already given his Austrian duchies to his brother Ferdinand, king of Hungary and Bohemia, and he now gave Spain, the Netherlands, his great American possessions, and his duchy of Milan in Italy to his only son Philip, who had married Queen Mary of England. Charles had hoped that his son would succeed him as emperor, but the electors refused to accept Philip, and chose Ferdinand instead.

Ferdinand was much more tolerant than his brother Charles, and in his reign and the reign of his son, the Protestants in the empire increased greatly in numbers. Many Protestant churches were built in the Roman Catholic states, and even in the family dominions of the em-



The first king of Prussia, Frederick I., was a good ruler, and so that his subjects should be able to read the Bible, he started thousands of schools in the villages and compelled the children to attend. Here he is visiting a school and examining the children. Frederick I. crowned himself king, and Frederick the Great said of this: "It was as though he told his successors, 'I have won for you a title; make yourselves worthy of it.'"



During most of his life, Frederick the Great was engaged in wars which threatened to destroy his kingdom, but by brilliant generalship he defeated his enemies and made Prussia great. When not fighting, the king used to travel about his kingdom and talk with the people, encouraging them to make roads and canals and otherwise improve their country. This picture shows him on his travels, his subjects giving him a welcome.

peror, and some of the church states followed their bishops in adopting the Protestant faith.

But by the time that Ferdinand's grandson began to reign, a change had come. As they increased in number, the Protestants quarreled among themselves, Lutherans and Calvinists hurling the name of heretic at one another. As the Protestants became weakened by division, the Roman Catholic princes, who stood together, and looked upon their Protestant subjects as traitors as well as heretics, determined to stop any form of Protestant worship, and began to encroach on the rights given to the Protestants. This state of affairs could not last, and trouble broke out in Bohemia.

THE BEGINNING OF THE THIRTY YEARS WAR

The Bohemians, most of whom were Protestants, feared that Ferdinand II would oppose them, as he had already oppressed the Protestants in part of the Austrian territories. They rebelled against his authority, asserted that he had been unlawfully declared king, and invited Frederick, the young elector of the Palatinate, to come and reign over them. Frederick's wife was the Princess Elizabeth of England, daughter of James I, whom the Bohemians expected to send help to the prince, and they also hoped that the other Protestant princes would go to their assistance. They were disappointed, and with the help of Maximilian, the duke of Bavaria, the poor "Winter King," as Frederick was called, was defeated, and fled from Bohemia, and the emperor was able to treat the country as a conquered land.

The war might have ended there, but the emperor drove Frederick out of the Palatinate so that he might give it to Maximilian of Bavaria, who coveted it. Other princes, under the leadership of Christian IV of Denmark, then went to Frederick's assistance, and the war became a struggle between the Roman Catholics and Protestants in the empire. It lasted for thirty years, and during this time, every part of northern Germany was ravaged again and again with savage ferocity.

The greatest generals on the emperor's side were Tilly and Wallenstein, and Wallenstein's name became another word for cruelty. By an agreement with the emperor, he gave his soldiers no pay, and they lived by pillaging the people of the districts through which they passed.

THE COMING OF THE GREAT GUSTAVUS ADOLPHUS

In the early years of the war, the emperor's troops were victorious and it seemed as though the Protestant faith would be swept out of Germany. But a champion appeared in 1630, in the great king of Sweden, Gustavus Adolphus, who left his kingdom, and his baby daughter Christina, to the care of his counselors and went to the rescue of the distressed Protestants in Germany.

His army was not large, but it was well trained, and he held it in iron discipline, and when the North Germans found he could lead them, they gathered under his banner. He induced the elector of Brandenburg, who had been making no attempt to stem the tide, to join him, won over the king of Saxony from the emperor's side, and got help from the king of France, with whom he was allied. At first the emperor's courtiers sneered at the "Snow King" as they called Gustavus, but the emperor's soldiers soon found that they had met one of the greatest soldiers of the age. Tilly, whom he defeated in two battles, died of his wounds, and then Wallenstein, who had been dismissed by the emperor, was recalled. Gustavus met him at the battle of Lutzen, near Leipzig, in November, 1632. The Swedish army won the day, but they mourned as if they had been defeated, for the king was slain, and historians say that his death was a greater hurt to his cause than the loss of ten battles.

There was now no one who could oppose Wallenstein, and it appeared as if the emperor would be victorious. But Wallenstein, who was as ambitious as he was cruel, was accused of plotting to put himself in the emperor's place, and he was assassinated by some soldiers in his own army.

THE BITTERNESS OF A WAR THAT NEVER SEEMED TO END

After his death the war went on and on, until the whole country was completely exhausted. From the commencement of the fighting Spanish soldiers had been helping the emperor, and French and Swedish, German and Spanish armies swept back and forth over the famished land. Now one side, now another was victorious, but the unfortunate

people saw little difference between the cruelties and oppressions of one army and those of another. At last, when thirty years had passed, and men had almost forgotten why the war began, peace was made. A conference met in Westphalia to which delegates were sent by all the princes who were at war, and after four years of negotiation a treaty, called the Peace of Westphalia, was signed in 1648. By this peace it was agreed that the Roman, Lutheran, and Calvinist faiths were to be equally tolerated throughout the empire, except in the Austrian dominions, which were to remain purely Roman Catholic. The princes of the empire were given the right to make treaties or wage war, not only among themselves but with foreign nations, and the shadowy power of the emperor almost vanished.

The Protestant princes were permitted to keep the church lands they had taken before the year 1624. Holland and Switzerland were given independence; part of Pomerania was given to Sweden, and Alsace and the bishoprics of Metz, Verdun and Toul were made part of France. Long before this the war had become wholly political, and every one tried to get something out of the wreck. The princes of the empire were each greedy of making gains, Louis XIV wanted to make the Rhine the boundary of France and from the beginning the Swedes had been ambitious of making the Baltic a Swedish lake.

THE SADNESS OF THE DESOLATE LAND WHEN THE WAR WAS ENDED

The whole country lay in ruin. Towns had been destroyed, woods flourished where once villages and cultivated land had been. Commerce had disappeared. The population had been reduced from twenty millions to six, and the spirit of the people that remained was crushed and broken. It was a hundred and fifty years before Germany began to show signs of prosperity again. So weak and disheartened were the people that they had no spirit left to oppose the princes, who began at this time to make themselves more absolute than ever they had been before. Instead of helping the people to recover from their misery, they tried to copy the magnificence of the court of Louis XIV of France. Many of the princes built great palaces and fortresses, and the unfortunate peasants were taxed to pay for these costly and useless luxuries. Louis, who desired to weaken the empire still more, so that he might be able to win more territory, encouraged them in their extravagance, and some of them were not above being in his pay.

THE AMBITIONS OF LOUIS XIV AND THE WARS WHICH THEY CAUSED

The ambition of Louis XIV soon brought war again within the borders of the worn-out country. At that time the country which we now know as Belgium was part of the dominions of the Spanish king. Louis tried to take it, saying that it really belonged to his wife, who was a Spanish princess, but was prevented by William of Orange, the stadtholder or chief magistrate of Holland. Some of the German princes became the allies of Louis; the war was carried into Germany and the Palatinate was again devastated. Louis did not succeed in gaining the Netherlands, but by the treaty that ended the war, Franche Comté was added to France, and a few years later he took possession of the city of Strassburg.

HOW THE TURKS WERE BEATEN BACK FROM THE GATES OF VIENNA

Scarcely had peace been signed before Louis again invaded the Palatinate on the pretence that part of it belonged to his brother's wife. To help him in his plans, he encouraged the Turks, who had again begun to advance in Hungary, to invade Austria, and with 200,000 men, the Turkish general, Kara Mustapha, swept through that country and laid siege to Vienna. The siege lasted two months, and though the city made a brave resistance, it was on the verge of being captured when John Sobieski, the last great king of Poland, came to the rescue. With an army of Poles and Germans, he drove the Turks from the walls of Vienna, and their power has ever since been on the wane.

Soon after this, since King William of England and Holland had entered the war against him, Louis was compelled to make peace, and give back all the cities he had taken except Strassburg. His ambition, however, was not curbed, and when, a few years afterward, the king of Spain died without heirs, Louis commenced another war to make his grandson, Philip, king of Spain, a title which was also claimed by the emperor. In this war, which was also fought out in

Germany and the Netherlands, England and Holland were the emperor's allies, and the famous battles of Blenheim, Ramillies, Oudenarde and Malplaquet were won by the English duke of Marlborough, and Prince Eugene of Savoy. This war, which was also carried on in America between the French and English, is known in European history as the War of the Spanish Succession, and in the history of the United States as Queen Anne's War. It did not end until 1713, when it was closed by the Peace of Utrecht. Some of the princes of the empire fought against the emperor, but some of them were on his side, and among these were the elector of Hanover, who was afterward George I of England, and the elector of Brandenburg, who had at this time the finest army in the empire.

HOW PRUSSIA ROSE TO BE A GREAT POWER IN GERMANY

At the close of the Thirty Years War, Brandenburg was a wreck, but the young elector, Frederick William, was one of the few princes who, instead of wasting what was left in luxury, used all his strength in building up the prosperity of the country. Since his time his descendants have played a most important part in the history of Germany, and have made Prussia so important that when we speak of Germany we think of Prussia. The rise of the house of Hohenzollern, to which they belong, is one of the romances in history, and we must go back and learn something of their story.

In the twelfth century, Frederick, count of Hohenzollern, married the daughter of the burgrave or chief magistrate of the important Imperial City of Nuremberg, and when his father-in-law died became burgrave in his place. His descendants continued to hold this rich office, and even became princes of the empire. They prospered exceedingly, and, in the thirteenth century, Frederick of Nuremberg had sufficient influence to have his uncle, Rudolph of Hapsburg, elected emperor.

THE RULE OF THE GREAT ELECTOR IN BRANDENBURG

All the Hohenzollerns were shrewd, thrifty men. They amassed great riches in the family and when the Emperor Sigismund needed a large sum of money Frederick IV, burgrave of Nuremberg, was able to lend it to him. As security for repayment he took a mortgage on the mark of Brandenburg, a state in North Germany, and within a year or two, was invested with the titles of margrave and elector of Brandenburg. The electors of Brandenburg were wiser than their neighbors and did not adopt the practice of dividing their territories among their sons. On the contrary a family agreement was made to keep the family possessions undivided and as time went on their dominions were increased, by purchase or inheritance, or by conquest. For instance, when the duke of Prussia died in 1618, he was succeeded as duke by his cousin, the elector of Brandenburg, who had married his daughter. At the close of the Thirty Years War, the ruling margrave, or elector, was a young man, Frederick William I, who is known as the Great Elector. When peace was made, Frederick William was able to gain some of the church lands and part of Pomerania, and thus enlarged the territory that his father had left him.

The Great Elector is justly held in honor by the Prussian nation. He built a canal to join the Elbe to the Oder, made roads, drained swamps, improved agriculture and encouraged education, and before he died he succeeded in making Brandenburg the most important state in North Germany. Frederick saw that he could not have good government while the nobles were strong enough to defy him. He succeeded in curbing their power, but by so doing made himself almost an absolute ruler. He never even thought, however, of giving any share in the government to the rest of the people, and when the nobles lost power, there was nothing to check the power of the elector. The peasants were not freed from serfdom until the beginning of the nineteenth century.

Up to the Great Elector's time, Prussia had been a fief of Poland, but by taking first one side, and then another in a war between the kings of Poland and Sweden, he was able to gain complete independence of the duchy. He created a powerful army, and took part in all the wars of his time. Sometimes he was on the side of France, sometimes on the side of Holland or the emperor against Louis.

His son Frederick was not content with the title of elector; he wanted to be king. So he bought the title from the emperor by sending an army of 10,000 men to help in the Spanish Succession War. As

king, however, he wished to be quite independent, and so he took his title from Prussia, which was outside the empire, and crowned himself king in Prussia.

How Frederick the Great Built Up the Prussian Power

Of Frederick's successors, Frederick William, and Frederick the Great, you may read in another place in this book. We need only say here that Frederick the Great welded his scattered dominions into the kingdom of Prussia. When he became king, Brandenburg was stronger than any other state in the empire except Austria, and before he died he made Prussia the rival of Austria, and began a struggle to see which should be supreme in the empire. During his reign the whole empire was again convulsed by the War of the Austrian Succession, in which the king of France helped the king of Bavaria to try to get the Austrian dominions away from Queen Maria Theresa. This war was partly caused by Frederick's ambition to gain territory, and the Seven Years War, of which we read in the story of Frederick, was a direct result of his conquest of Silesia from Austria.

The Seven Years War was fought out in several parts of the world, and is known in the history of the United States as the French and Indian War.

Frederick helped to make the elector of Bavaria emperor as Charles VII, but after the death of Charles, Maria Theresa's husband, Duke Francis of Tuscany, was chosen to succeed him. When the Emperor Francis died, he was succeeded by his son and Maria Theresa's, and so the title of Holy Roman Emperor went back to the Hapsburgs, who held it until Napoleon's time.

The French Revolution and the Wars That Followed It

When Frederick the Great died in 1786, Louis XVI was king of France, and with his wife Marie Antoinette, the beautiful daughter of Maria Theresa, he held court at Versailles with great magnificence. But a few years afterward, the French Revolution broke out. As we have read in the story of France the king and queen were deposed, France was declared a republic, and Louis and Marie Antoinette were put to death.

It took time for all these things to happen. Before the execution of Marie Antoinette, her brother Joseph II, and her brother Leopold II who succeeded him, had both died, and Francis II, who was not so wise as either of the two, was emperor. But Frederick William II, who followed Frederick the Great as king of Prussia, had made an alliance with Leopold to oppose France, restore the kingdom, and keep the doctrines of the Revolution out of their dominions.

This alliance brought on a war with France, for the French Assembly, fearing that Austria and Prussia would invade their country, declared war against Austria, and this war was continued by Francis II. The war gave Napoleon an opportunity to realize his desire for conquest, and his dreams of empire. After he rose to power, Austria and Prussia were in turn defeated and humiliated. War followed war, and victory by the French was piled on victory. During these wars, and by reason of these victories, the Rhine was made the frontier from Switzerland to Holland. All the free towns, except Bremen, Lübeck and Hamburg, lost their independence, and the little states which were ruled by knights and bishops were made part of the larger states by which they were surrounded. At the close of 1805, Napoleon forced Francis II, Emperor of Austria, to sign a treaty which declared that all the states of Germany then in existence were sovereign states. This ended forever the Holy Roman Empire. Francis formally renounced the title of Holy Roman Emperor, and was known from thenceforth as Emperor of Austria, a title that he had taken to himself two years before.

During the Napoleonic Wars serfdom disappeared from all the German countries which had composed the Holy Roman Empire, except Austria. In most of the states the last traces of bondage simply slipped out of sight, but in Prussia the serfs were freed by a royal decree made in 1807. Up to this time the Prussian peasants had been compelled to live on the land on which they had been born. Henceforth every man was free to go where he would, without the consent of his lord, and even to buy land if he wished. Thus the people gained much, in spite of defeat and humiliations, and they have never since that time been placed in such subjection as they had been in before. No political rights were granted them until forty years later.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2593.

SCENES FROM THE STORY OF OLIVER TWIST





Oliver Twist was an orphan, who was brought up by the parish until he was ten. They were so badly fed in the workhouse, getting little more than a small basin of thin gruel for each meal, that the boys drew lots for one of them to ask for more. It fell to Oliver to make this request. His boldness resulted in his being sent out of the workhouse as an apprentice to a coffin-maker, from whom he ran away, and fell in with a gang of young thieves in London. One of them, the "Artful Dodger," robbed a gentleman at a bookstall, but Oliver was captured. The bookseller proved Oliver was not the thief, and the gentleman took him to live with him.





But Oliver was recaptured by Fagin, the leader of the thieves, and was handed over to Bill Sikes, to assist that villain in the burglary of Mrs. Maylie's house. Oliver made up his mind that when he was put through the window he would alarm the household, but before he could do so he was shot in the arm by the butler. Here again he fell in with friends, as Mrs. Maylie adopted him, and educated him like a young gentleman. In the last picture we see Fagin and a man named Monks, who have an evil plot against Oliver, watching him as he was asleep at his books on a summer day. But, happily for all, these scoundrels are punished at last.

These pictures are from the famous original engravings by George Cruikshank in the first edition of "Oliver Twist."

THE STORIES OF CHARLES DICKENS

MOST of the great novels of Charles Dickens were written "with a purpose." While they were first of all intended to amuse the reader, they were also meant to draw attention to some unhappy state of things which the author, out of his warm love of humanity, sought to have abolished. Thus in "Oliver Twist" he exposes the shameful state of the public workhouses at the time of which he wrote, the early years of last century, and the result of the book was so to awaken interest in the life of the pauper poor that before long there were no Mr. Bumbles to tyrannize over the workhouse children. In the story called "Dombey and Son," whose full title is "Dealings with the Firm of Dombey and Son, Wholesale, Retail and for Exportation," we see how love of money-making and mere pride in business success are poor substitutes for the happiness that comes from love and affection for our own relatives and others.

THE BOY WHO ASKED FOR MORE

BEING THE STORY OF OLIVER TWIST

CONTINUED FROM 2462

IN the workhouse of a certain English town a baby boy was born. He was christened Oliver Twist, because the beadle, or workhouse officer, whose name was Bumble, gave names to the children born in the workhouse by going through the alphabet from A to Z in the order of their births. He had got to T when Oliver was born. As the mother of the new parish baby died soon after his birth, Oliver was in every sense a poor foundling without friends or relations, so far as anyone knew. This was truly a very unpromising beginning for the boy, but we shall see how fortune favored him after many extraordinary adventures.

In those days the workhouses of England were shamefully conducted. The one thought of all who were responsible for their management was how to run them cheaply, and as a consequence many of the poor young inmates were done to death by slow starvation and brutal treatment. When Oliver had grown into boyhood, he was sent to live with a Mrs. Mann, who kept a branch workhouse, where a number of other parish children were under her care, all being treated worse than dogs. After a time, however, he was taken back to the chief workhouse to undergo his "education" along with other boys of his age. But though he had been starved to a skeleton at Mrs. Mann's, matters were, if anything, worse at the workhouse now, for the board had decided to carry out further economies in the feeding of the inmates, and the result of this was to be of the greatest importance to poor little Oliver.

"The room in which the boys were fed was a large stone hall, with a copper at one end, out of which the master, dressed in an apron for the purpose, and assisted by one or two women, ladled the gruel at meal-times. Of this festive composition each boy had one porringer, and no more—except on occasions of great public rejoicing, when he had two ounces and a quarter of bread besides. The bowls never needed washing. The boys polished them with their spoons till they shone again; and when they had performed this operation (which never took very long, the spoons being nearly as large as the bowls), they would sit staring at the copper, with eager eyes, as if they could have devoured the very bricks of which it was composed, employing themselves, meanwhile, in sucking their fingers most assiduously, with a view of catching up any stray splashes of gruel that might have been cast thereon. Boys have generally excellent appetites. Oliver Twist and his companions suffered the tortures of slow starvation for three months; at last they got so voracious and wild with hunger that one boy, who was tall

for his age, and hadn't been used to that sort of thing (for his father had kept a small cook-shop), hinted darkly to his companions, that unless he had another basin of gruel each day, he was afraid he might some night happen to eat the boy who slept next him, who happened to be a weakly youth of tender age. He had a wild, hungry eye; and they implicitly believed him. A council was held; lots were cast who should walk up to the master after supper that evening, and ask for more; and it fell to Oliver."

OLIVER ASTONISHES THE WORKHOUSE MASTER BY ASKING FOR "MORE!"

"The evening arrived; the boys took their places. The master, in his cook's uniform, stationed himself at the copper; his pauper assistants ranged themselves behind him; the gruel was served out; and a long grace was said over the short commons. The gruel disappeared; the boys whispered to each other, and winked at Oliver; while his next neighbors nudged him. Child as he was, he was desperate with hunger, and reckless with misery. He rose from the table; and advancing to the master, basin and spoon in hand, said, somewhat alarmed at his own temerity:

"'Please, sir, I want some more.'

"The master was a fat, healthy man; but he turned very pale. He gazed in stupefied astonishment on the small rebel for some seconds, and then clung for support to the copper. The assistants were paralysed with wonder; the boys with fear.

"'What!' said the master at length, in a faint voice.

"'Please, sir,' replied Oliver, 'I want some more.'

"The master aimed a blow at Oliver's head with the ladle; pinioned him in his arms; and shrieked for the beadle."

OLIVER IS APPRENTICED TO A COFFIN-MAKER AND RUNS AWAY

The end of the matter, so far as the workhouse authorities were concerned, was to offer five pounds to anybody who would take this bold boy off their hands and make him an apprentice. So, as speedily as possible, he was put out to an undertaker named Sowerberry, where he was fed on the scraps left over from the family table, and had to sleep under the counter. An older boy, named Noah Claypole, who was employed there, bullied the pale-faced little fellow so much that Oliver turned upon him one day in the kitchen, and thrashed him, despite the efforts of Charlotte, the servant, to keep him away from Noah, who was her favorite. Of course Mrs. Sowerberry took the word of Charlotte and Noah that Oliver was a little wretch who required punishment, and Noah ran away to bring the fat and lazy Mr. Bumble, who was not at all surprized, he assured them, to hear of any outrage by that terrible boy, Oliver. Rather against the will of the undertaker, who had found the boy useful, on account of his pale, sad face, at funerals, Oliver was shut up in the dark cellar for the night. Early next morning he escaped from the undertaker's, and set out to walk to London.

It was a long and toilsome journey which the unhappy boy had undertaken, and after six days' tramping and begging food, almost dead with fatigue and hunger, he reached Barnet. Here he fell in with a young rascal who had much to do with his later fortunes.

OLIVER FALLS IN WITH THE ARTFUL DODGER ON HIS WAY TO LONDON

He was a jolly, free-and-easy vagabond, this new acquaintance, who promised to put Oliver in the way of a living when they got to London. John Dawkins by name, he was more famous as the "Artful Dodger," and when he got to the outskirts of the town, in company with the country boy, Master Dawkins lingered about till dark, as he thought he was too well known in London to be seen entering it in full daylight. Through the lowest streets of the town the Dodger piloted innocent and weary Oliver, and landed him at last in an evil-looking street, where he gained admission to a still more evil-looking house. This was none other than the notorious den of Fagin, the Jew.

Here the astonished boy discovered the master of the house cooking sausages at the kitchen fire, while a number of other youths, resembling the Dodger, were smoking and drinking at the table. Fagin, with his long, rough beard and tousled hair, of reddish colour, his great hook nose and dirty, swarthy face, his bent shoulders and thin, bony figure, clad in threadbare clothes, was the very picture of evil. Oliver could not at first realize that he was in a den of thieves, and that he was supposed to be a new pupil for Fagin. But

so it was, and he soon discovered that the Jew spent much of his time in teaching his young rascals how to pick pockets.

One day Oliver was out with the Dodger and Charley Bates, another of the young thieves. Oliver had no idea of what they were bent on, and he didn't understand half of the slang words they used. But they tried to rob an old gentleman who was examining books at a bookshop window; and, amazed at this, Oliver ran away from them, only to be caught and accused of the theft. Fortunately, the bookseller saw the whole thing; and the old gentleman, whose name was Mr. Brownlow, was so convinced that Oliver was an honest, truthful boy that he took him to his own home and decided to keep him as his adopted son. His housekeeper, Mrs. Bedwin, soon grew to love the lonely little boy, and he was treated so kindly that it seemed as if his troubles were over; but, alas! that was not so. One day, when he was sent out with some books and a five-pound note to take to the bookseller, poor Oliver was captured by Nancy, a pupil of Fagin, and Bill Sikes, a great brutal burglar, whom Fagin employed.

HOW OLIVER WAS KIDNAPPED FROM HIS KIND FRIEND MR. BROWNLOW

They carried him off a prisoner to the Jew's den once more. He was in despair at what his kind friends, Mr. Brownlow and Mrs. Bedwin, would think of him; but Fagin would not let him go. The Jew had some plan for him, and a prisoner he remained, until one night he was taken away by Bill Sikes, and next morning set out with that scoundrel on a long journey into the country.

At Chertsey, on the Thames, there was a house which Sikes and Toby Crackit, another burglar, were to rob; and Oliver was to be used, because he was little, for putting through a small kitchen window, so that he might go through to the hall and let the burglars in. When he understood what they meant him to do, he determined to alarm the people in the house and tell them all; but he did not get the chance to do this, as Giles, the butler, and Brittles, a serving lad, had heard the noise of the window being forced, and, coming downstairs in time, fired at Oliver, wounding him severely in the arm. Bill Sikes had just time to pull the lad back through the window and make off with him. Eluding pursuit, the burglars left Oliver for dead in a field and made off. Next day, when he recovered, poor Oliver dragged himself to the house Sikes had meant to rob, and was recognized as the boy who had been shot by the butler.

ANOTHER TERRIBLE ADVENTURE THAT HAD A HAPPY ENDING

Mrs. Maylie, the owner, and her adopted niece were moved to pity for the poor boy, whose innocence was plain to them; and Mr. Losborne, their great friend, managed to put the police off his track in a very clever way, being convinced that the boy was no willing party to the attempt on the house. When Oliver had recovered his strength somewhat, he told his whole story; and Mr. Losborne, who was a generous, impulsive gentleman, determined to punish Fagin and the others, and to find out Mr. Brownlow. Unhappily, Mr. Brownlow's house was empty, and to be let, when he took Oliver there to see him.

Oliver's new friends did not lose faith in him. When, as he sat at his lessons one day, he saw Bill Sikes and another man staring at him through the window, it was clear that some mischief was plotted against the boy, so friends brought him to London where they thought he would be out of danger. Now, poor Nancy, the companion of Bill Sikes, had always had a tender place in her heart for Oliver. It happened that she had overheard such words as would put Fagin and this other man, who went by the name of Monks, at the mercy of Oliver's friends, so when they were staying in London, poor Nancy went and told Rose Maylie all she knew.

THE FATE THAT OVERTOOK ALL THE ENEMIES OF OLIVER TWIST

Thanks to the efforts of Mr. Losborne and Mr. Brownlow, who had now returned from a stay abroad and had met Oliver again, to the delight of both, the deep-laid plot against the orphan boy was, bit by bit, unfolded. The man named Monks was really the half-brother of Oliver, and his father's fortune had been left to be divided equally between him, his sister, and Oliver, on condition that Oliver never did anything to make his name dishonorable. Monks had employed Fagin,

who in turn employed Nancy and Bill Sikes, to make Oliver a thief; but, as we have seen, all their schemes failed. Mr. Bumble, who had married the matron of the workhouse, who knew part of the secret of Oliver's birth and told it to Monks, was, with his wife, made to confess what they knew. Monks admitted all, on being allowed to go free with half of what remained of the fortune, which he speedily squandered. But poor Nancy was killed by Sikes for having betrayed Fagin, and Sikes himself met his death in trying to escape from the roof of a house where he had been pursued.

Noah Claypole had in turn become one of Fagin's pupils and informed on him, so that Fagin was tried and executed at Newgate for his crimes. The Artful Dodger had before this been caught and "transported," as those were the days when many criminals were shipped from England to Botany Bay in Australia.

Not only was Oliver proved to have been an innocent and honorable boy through all his terrible temptations, and so worthy of wha remained of his father's fortune, but in Rose Maylie, whom he loved dearly for all her goodness to him, he found a sister, as it turned out she was the sister of Monks. Rose married Mrs. Maylie's son Harry, who became a country parson; and Mrs. Maylie and Oliver went to live in the same village. Old Mr. Brownlow and his housekeeper also took up their home there; nor could Mr. Losborne bear to be separated from these good friends, so he moved there also. And Mr. Brownlow's friend, Mr. Grimwig, who once doubted Oliver's honesty, was a frequent visitor to the village.

THE FATE OF DOMBEY AND SON

MR. PAUL DOMBEY was a cold, hard, stern man, not at all the kind of man who loves children, and yet he wished to have a son of his own. The reason for this was that he was very rich and his whole interest lay in his business in the city; if he were to die without a son the firm would no longer be Dombey and Son, a name of which he was very proud. He had a sweet and gentle daughter of six years old, but he cared nothing at all for her, because a girl would not be able to keep up his great business. Now, Mr. Dombey had been married for ten years when two things happened to him which were of great importance to his life—a little Paul Dombey was born, and Mrs. Dombey died. Thus the event he had so longed and hoped for with joy was clouded with sorrow by the death of his wife.

THE LOVE OF FLORENCE DOMBEY FOR HER LITTLE BROTHER PAUL

Little Paul Dombey was an ailing child and from infancy he was delicate, needing the most loving care to keep his little life from flickering out altogether. It was a sad thing for him that his mother had died; but there were two people who loved him in very different ways—his money-loving father and his tender sister Florence. Indeed, this sister bestowed upon him all the love she had, for she was very lonely and her heart cried out to be loved. In return Paul thought there was no one like Florence, and could not bear to be separated from her for a day. Thus it was that when he was five, and the doctors had said that he should live by the sea in order to have as much of the invigorating air as possible, Florence went with him to Brighton.

PAUL DOMBEY'S SCHOOLDAYS WITH DR. BLIMBER AT BRIGHTON

Paul was sent to a school which was kept by a Dr. Blimber, and he had a very dull life for a boy of his age. There were ten other boys at this school, and Dr. Blimber was a most learned man, who made them all study so hard that they could think of nothing but their difficult tasks all day long, and had not enough spirit left in them to indulge in pillow-fights or other amusements of boys in boarding-schools. But Florence did all she could to help little Paul with his lessons, and the brother and sister were both happy at Brighton in their love for each other, when one day two visitors came to see Mr. Dombey, who was also staying at Brighton at that time. These two people were Captain Cuttle—an old sea-roving man with a hook instead of a hand attached to his right wrist—

and a good-looking young man who had lately come into the office of Dombey and Son. His name was Walter Gay, and he had met Florence before in a strange way. Once when Paul was a few months old his nurse became anxious to see her own children, but she lived in a poor district and was afraid to take Paul and Florence with her down the dirty, narrow streets.

HOW FLORENCE DOMBEY FIRST MET WALTER GAY

But at last her desire to see her own children grew so great that she went with Paul and Florence to her own house in Stagg's Gardens. As she was coming back again to Mr. Dombey's there was a panic in the streets; people were crying out, "Mad bull! Mad bull!" and running away. Florence was terrified, and in her alarm she lost sight of her nurse. In another minute Florence was "lost," not knowing where to turn, and a horrible old woman led her away down some narrow streets and took her to a miserable house, where she removed Florence's pretty dress, her shoes, and all her dainty clothes, and, giving her some rags in their place, let her go away. It was then that Walter Gay had found her, and, taking her to his uncle's, Solomon Gills', shop, brought her afterwards to her own home. From that day the two young people—for Walter was not much older than Florence—loved one another dearly and never forgot their adventure.

But on this occasion no one was lost; they had come, Captain Cuttle and Walter, to ask Mr. Dombey, who did not care for Walter, to lend them some money to rid them of a debt which poor old Solomon Gills was called upon to pay for a fault of Walter's father.

HOW LITTLE PAUL MADE CAPTAIN CUTTLE AND WALTER GAY HAPPY

Mr. Dombey asked Paul what he would do if he had the money, and Paul at once said he would give it to them. He knew, although he was so young that money cannot provide the things that are dearest to us, and what he wanted most were his mother and his health; so that when he could make Walter happy with the money, he thought he was making the best use of it to allow him to take it as a present. Walter was also taken into the employment of Dombey and Son. Some time after this, however, Mr. Dombey's manager, whose name was James Carker, was talking with Mr. Dombey about sending a youth to their foreign office in the Barbados, and Walter was chosen to go, for neither of them liked him, and they wished him out of the London office.

The happy days of Paul and Florence were not to last for long. When Paul had been in Brighton for some time he seeemed to grow weaker instead of stronger. Florence and he clung to one another all the more as Paul's life seemed flickering out, yet not all the care in the world could save him, and he died with his arms round his dear sister's neck. Mr. Dombey's grief was very great, but it came from pride rather than real love of his son, as the cause of his sorrow was the thought that Dombey and Son would not be the name of his firm in the future.

Before very long Mr. Dombey met a beautiful but cold, proud, and stately young widow, named Edith Granger. She had been brought up by a hard-hearted mother, who cared for nothing but money and pleasure; so that when this wealthy gentleman wished to make her his wife, she thought she would be better with him than living in poverty.

MR. DOMBEY'S SECOND MARRIAGE AND WHAT CAME OF IT

Of course, as neither of them really loved the other, their marriage could scarcely be a happy one. Mr. Dombey thought that his bride's dignified figure and stately grace would look well at the head of his table, while she herself thought that his money would buy her fine clothes and jewels. Yet sleeping in her heart was the wish to be loved and to possess the loving nature which might have been hers but for her upbringing, and she soon grew very fond of lonely Florence, trying her best to fill her mother's place and console her for the loss of her beloved brother Paul.

Mr. Carker, whom we met before when Walter's future was decided, was a very wicked man. He was trusted thoroughly by Mr. Dombey, whom he pretended to respect greatly, yet all the while he was plotting and planning to bring about his downfall. He thought that the easiest way to harm him was to raise up strife between the husband and wife. Overhearing the newly married couple quarreling because Mrs.

Dombey had been indifferent and haughty to her husband's wealthy friends, Carker, in his sly way, induced Mr. Dombey to try to break his wife's pride. He was made the messenger of Mr. Dombey to tell Edith that she was not to show so much affection for Florence—now about seventeen or eighteen, and a very pretty girl—as it made too great a contrast between her feelings for her husband and her stepchild.

MRS. DOMBEY LEAVES HER HUSBAND AND POOR FLORENCE IS DRIVEN FROM HOME

At length Edith could no longer endure the insults put upon her pride even before the deceitful Mr. Carker and Florence, and one night she took off and threw down the diamond bracelets from her arms, the jewels from her hair, and, treading on them, told her husband she could no longer live with him. She did not even say good-bye to her stepdaughter, and before anyone knew exactly what had happened she was gone.

Florence, though so often repulsed by him, still loved her father, and wished to comfort him in his sorrow. She ran to him, crying out, "Oh, dear, dear papa!" and held out her arms to him; but he struck her cruelly and told her to follow her stepmother. There was now for the poor girl neither father, mother, brother, nor home, and in her trouble she could think of but one place to which she might go; this was to the shop which had been kept by the uncle of her dear friend Walter Gay.

While sorrow had come to this great house of Dombey, it had not left alone the humble home of Walter Gay. The ship on which he had sailed was a wreck, and the old uncle had left his shop to seek for his nephew, if he were alive, so that when Florence reached the shop she was met by Captain Cuttle.

FLORENCE DOMBEY FINDS A GOOD FRIEND IN OLD CAPTAIN CUTTLE

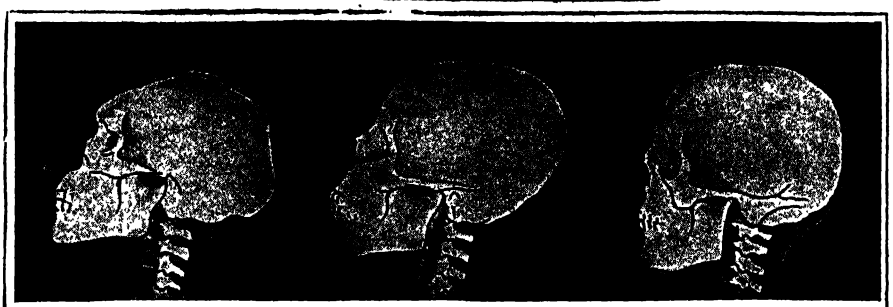
Greatly delighted he was to see her, carefully he prepared the bed in Walter's old room for her, and he accompanied her whenever she went out shopping. His one disappointment was that she would take no money from him for her little needs, as she had some money of her own. Then Captain Cuttle one night told her a wonderful story of a brave boy who had sailed abroad, been wrecked, but by a miraculous chance had been saved after much tossing on the angry sea. Before he could say much more a bright-faced young man was beside her. It was Walter Gay, whom she had loved as though he had been a brother. You may imagine what a happy meeting this was, and how many happy days were to follow in which the young people grew to love each other more and more dearly, until at last it was decided he should become even more to her than a brother, and before long they were married.

In the meantime Mrs. Dombey had fled to France, and there she met Mr. Carker. Mr. Dombey followed them, and Edith had scarcely had time to tell Mr. Carker of her great hatred for him when he found that his former master had tracked him out. By coach he made his way for days towards the coast of France, his pursuer following him closely. At length Mr. Dombey overtook him, but while he was stepping aside to elude his pursuer, Mr. Carker fell on the railway track, the great engine was upon him, and crushed him to death. So perished this wicked man, though even yet his influence for evil was to continue. When Mr. Dombey reached his home he discovered that he was ruined, that Mr. Carker, in whom he had so greatly trusted, had been for years robbing him of his money.

FLORENCE FORGIVES HER FATHER AND MAKES HIM HAPPY IN HIS OLD AGE

Now, though it may seem that Mr. Dombey deserved all his troubles for his cruelty, Florence's heart went out to the father who had never been kind to her. As he sat alone the night before he was to leave his fine house, thinking about his past, there came to him in his loneliness one whom he had never pitied in her loneliness, and the loving arms of his little Florence were clinging to him. She begged him to forgive her for having left him, and told him of her marriage. Then she made him even more happy by telling him that she had a little son, whom she had called Paul, and that he was like the child of whom they had once been so fond. So, though the firm of Dombey and Son, which had once been his pride, almost his worship, was now no longer in existence, the old man at last found true happiness in the love of his daughter and her little children, Paul and Florence.

THE NEXT STORIES OF FAMOUS BOOKS ARE ON 2662.



In animals the skull is all behind the face. These pictures show how in man the skull has doubled over in front to make room for the brain. The first is the skull of an Australian native, the lowest type of man, the second of a negro, and the third of a European, the highest type of man.

THE HEAD AND THE LIMBS

CONTINUED FROM 2468

WE have read about the bones in general and their services to the body, and especially we discussed the backbone, upon which the whole body is built; and we saw that it is specially curved in human beings, so that, after the baby stage, we walk erect. Now, upon this backbone there is beautifully poised the head; and this contains the brain, where *we ourselves* really live, and from which issue the orders to the limbs, whereby our living and willing show themselves. The orders to the lower limbs, or legs, take us where we wish to be, and the orders to the upper limbs, or arms, enable us to do what we wish when we have got there. Now we must study the head.

If we look at a very humble backboned animal, like the fish, or even at a much higher one, far nearer to ourselves, such as the dog, we see at once that the head is made of two parts. In front there is a part which is thrust forward, which we call the face. Its great business is to carry the most important organs of the senses—the eyes and the nose—much more important than the ears, which in the fish are very poor—and also to provide openings for the air—in the case of the dog—and another for the food to enter the body. Look at a greyhound, and you will see what I mean. And *behind* the face there is the other part of the head. This is rounded and rather large, and we call it the skull. It is the most important part of the whole skeleton, for it contains the brain. The brain of a fish is very small indeed, and its skull is small also; in the dog the brain is much larger, and so its skull is quite conspicuous. In the animals which come nearer to ourselves, the higher monkeys—usually called the man-like apes—the brain and the skull are much larger than in the dog. But even in the highest apes the skull is still *behind* the face.

Now, in ourselves the brain is really *enormous* compared with the brain of any animal, and room has had to be found somewhere for this great brain, which is, more than all things else, the thing which distinguishes our bodies from those of any animal. Room has partly been found sideways, so that our skulls stand out sideways from the neck very markedly. But the wonderful development of the brain in ourselves is by far the most marked in one particular part of it, which is its topmost part—topmost both because it is actually at the top, and because it does the highest kind of work, which is thinking. This topmost part of the brain has grown so large and so high that it has doubled over upon itself *forwards*, instead of standing straight up; and therefore the skull

of mankind has had to grow forwards to hold it. This means that the skull, which in the animals is entirely *behind* the face, has now grown over the face; and if we look at any man, woman, or child, we see at once something which shows this, the like of which cannot be found in any animal on earth, and that is the great forehead, the part of the head that—in every sense of the words—has "come to the fore," as we say. So while we still have a great expanse of skull behind our faces, like all animals that have skulls at all, we have a great part—and that the most important of all, as it holds the highest and most *human* part of the brain—placed above the face. The whole growth and development of the body, as well as everything else, depends upon the brain; and so, if we look at a very young baby, we find that, though its brain has yet such a lot to learn, it is larger in proportion than any other part of its body, including its face.

A REMARKABLE THING ABOUT A BABY WHEN IT IS BORN

So, in a baby, the face seems rather absurdly small, tucked away "anyhow" *under* the big skull, which is actually the widest part of the whole body of a baby. If we look at ourselves and see how narrow the head is compared with the shoulders or the hips, we can scarcely believe that, when we were first born, the head was wider than either. But so it was, and so it has to be to hold a brain big enough to control and direct successfully the growth and development of the little baby's body, which cannot even sit up, much less stand, until it becomes the wonder and the master of the world.

We find that some parts of the earth are inhabited by a very humble kind of men and women, who not merely know less than we do, but are not able to learn as much as we do, even when they get an equal chance; and we notice that these people do not have high and broad and straight foreheads, as we do, but that their foreheads are low and narrow, and slope very sharply backwards, almost suggesting the humbler forehead of a dog. We have no more right to despise these people than we have to despise any other creature that God has made. To do so is to despise God. But we must understand that they are less able to look after themselves and to protect themselves from evil things than we are, just because their brains are not so large as ours; and *therefore* a special duty falls on us, who have larger and better developed brains, to do right to these people, and not, for instance, to get rich by making slaves of them or to make slaves of them by selling to them alcoholic liquors which are unfit for any human being, or even a dog, to drink.

THE BRAIN IN ITS HOUSE AS STRONG AS A ROCK

If we understand how important the brain is, and that the skull is its house, we shall think it worth while to study the skull rather carefully. First of all, just a word as to its base, or under-surface. If we look at it, we notice two things. The first is that it is very strong, very thick, and made, in its greater part, of the densest and hardest bone in the whole body. Part of it is, indeed, called the *petrous* bone, from the Greek word for a rock, because it is so hard and strong. We use this same word when we say that a thing is petrified, or turned into a stony rock, and it is used in the Bible, where Simon was named Peter, the *rock*. The reason why the base of the skull is so tremendously strong is because of the great shocks it always has to bear. Every step we take—and far more so when we run or jump—means that a great shock runs up our legs, along the backbone, and so reaches the base of the skull. If this were not so strong as it is, it could not stand these constant shocks. As it is, only the most terrible accident will break it, and usually it is unbroken even when a man has had some awful fall from a height.

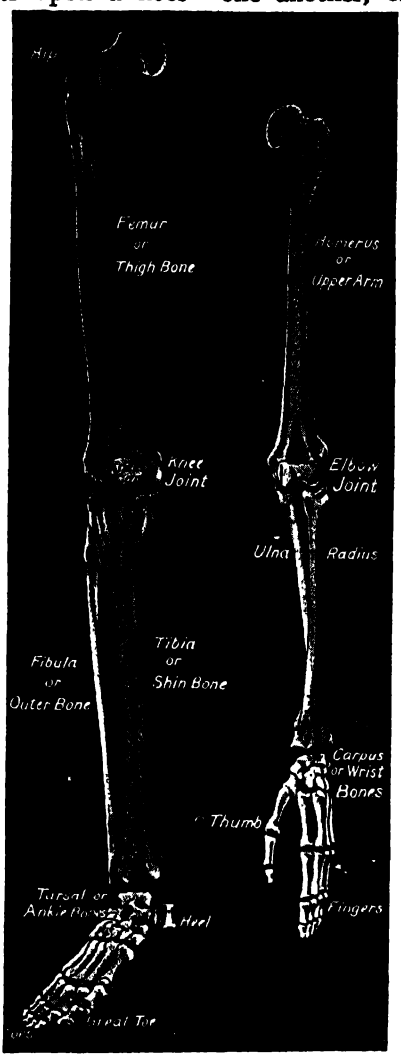
THE GREAT WONDER OF THE SKULL AND THE BRAIN

The second thing we notice about the base of the skull is that it is pierced with holes, small and large. They are so many and so confusing that it takes months to know them all—and then you forget most of them in a week! But there is one that nobody can forget, and that is the great hole we have already mentioned, through which the brain joins with, or runs into, the spinal cord. The other holes exist partly for blood-vessels to enter the skull and supply the brain with air and food, for veins to carry the used-up blood away from the brain, and for a host of nerves to travel to and from the

brain, and connect it with the face, the tongue, the lips, the nose, the eyes, the ears, the voice-box, and many other very important parts of the body.

Only in one or two places do we find that the brain rests upon a floor of bone which does not protect it thoroughly. The wall of the space which holds the eye-ball is, however, one of these places. It is possible for such a thing as the point of an umbrella very easily to pierce this thin plate of bone and so enter the brain at one of its most important parts. But the danger is not nearly so great as we might think; first, because the eye is greatly protected by the bony ring round it, so that a pointed thing must enter very straight if it is to pierce to the brain; and, secondly, because the eye itself is such a quick and sure guardian of its own safety, and can so rapidly, when it sees itself in danger, suggest to the brain that orders shall be given for the quick movement of the head to one side or the other.

The great vault of the skull is composed of a very special kind of bones. These bones are thin and beautifully curved, and they are most exactly jointed to one another. These are among the few cases in the body where bones are jointed together, but are *not* meant to move at these joints. This is the general rule in the head, and the only exceptions to it are the joints where the lower jaw hangs from the head, and the joints of certain tiny little bones inside the ears, which carry the sound waves from outside on their way to the nerves of hearing. The bones forming the vault of the skull will always break sooner than be disjointed from one another, or dislocated, as we say.

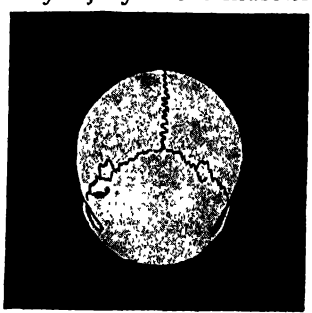


Our legs and arms are made up of many bones, and here we see what these are like, and their names. The knee-joint is the most wonderful joint in the body, but is more easily injured than any other. The bones of the legs and arms are much alike, but the leg has an extra bone—the knee-cap.

These bony plates are remarkable, because they are *not* formed from gristle or cartilage, as most bones are, but from sheets of a fibrous material or membrane. When a baby is born, and for a long time afterwards, there are at least two places in its skull where this membrane has not been changed into bone, and where we can feel a "soft place." One of these is much bigger than the other, and most of us have been allowed, perhaps, very gently just to touch this soft place on the top of a baby's head. We can imagine how risky the existence of the brain would be if all its covering were made of a soft membrane, instead of good, firm bones. This soft place was long ago called the "little fountain" by the Italians. Sometimes, if we look at it, or lightly rest a finger on it—it is easy to find on a baby's head—we can see or feel it quickly rising and falling, rather like a fountain. The reason is that at every beat of the heart the brain and skull are filled with a little more blood than is in them between the beats, and this raises the brain a little at each heart-beat under our finger. Sometimes a baby's pulse can be felt here when it cannot be felt anywhere else. Now,

if you have a little baby brother or sister, I don't want you, after reading this, to try to feel the little fountain for yourself, for you might press rather too hard, and babies are not born for us to try experiments on; but I want you to understand why every good mother or nurse is particularly careful to protect the head of a little baby from any injury.

We find that each of the bony pieces that make up the vault of the skull is gradually turned into bone from a point right in the centre of the piece of membrane that corresponds to it, and was there first. Even in the head of a fully grown-up person these places can be felt as "bumps," for the bone is a little thicker there than it is anywhere else. If we could see the brain underneath, we should find no "bumps" in it to correspond at all to these bumps on the skull—they are merely places where the bone is a little thicker than usual. So it is utter nonsense and rubbish for this one reason, as well as for scores of other reasons, to pretend to tell anybody's character and future by feeling the bumps of his skull.

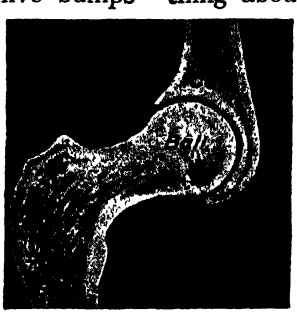


The top of our skull seems to be one bone, but is really several bones, dovetailed together, as seen here. It is easier to break the skull than to disjoint the bones.

You will be able to feel five bumps at least on your own head. On each side of the forehead there is one, just at the "corner," as we might say. Then, at the opposite corners of the head—as if the top of the head were a flat, oblong thing—there are two others, and these are the places where the side bones of the skull started to be made. And in the middle line of the skull, behind and low down, is the sharpest bump of all. This is of a quite different kind, though it is a true bony bump. It is a sharp piece of bone, meant to hold the muscles and strong elastic fibres of the back of the neck, which hold up the head and prevent the chin from falling on the chest, as it does when anyone is very sleepy, and his brain forgets to tell the muscles at the back of his neck to keep on pulling.

The skull of a human being is, however, very smooth indeed compared with some skulls. The skull of a cat or a tiger has many great ridges and crests and bosses of bone on it. The reason is that the tiger lives largely by the strength of its jaws. These need very large muscles to work them, and the muscles need large bosses and crests of bone on the skull for them to hold on to. Men are more muscular than women, and so, even in men, though their jaws are very weak compared with the tiger's, the skull is rougher than in women. A woman's skull is lighter and smoother and more rounded than a man's. It is also smaller, and holds a smaller brain. But a woman's brain is quite as big as a man's in proportion to the size of the body it has to look after. That fact is not known by the kind of men who are always despising women—probably because those men's own brains are too small for them to learn much.

The only bones of the face that are very important are the jaws, which hold the teeth, and we have learned something about them already; so now we can pass on to the bones of the limbs. We have seen already that the limbs of all the back-boned animals that have limbs are made on the same principle, and to describe the bones of any one of them is to describe, almost exactly, the bones of any other. Perhaps the collar-bone differs most of any, but it is big in ourselves, and in those creatures which use their upper or fore limbs at all as we do. We need say no more about it, except that it lies very near the surface of the body, as we all know, and that it is very apt to be broken by a bad fall on the arm or shoulder.



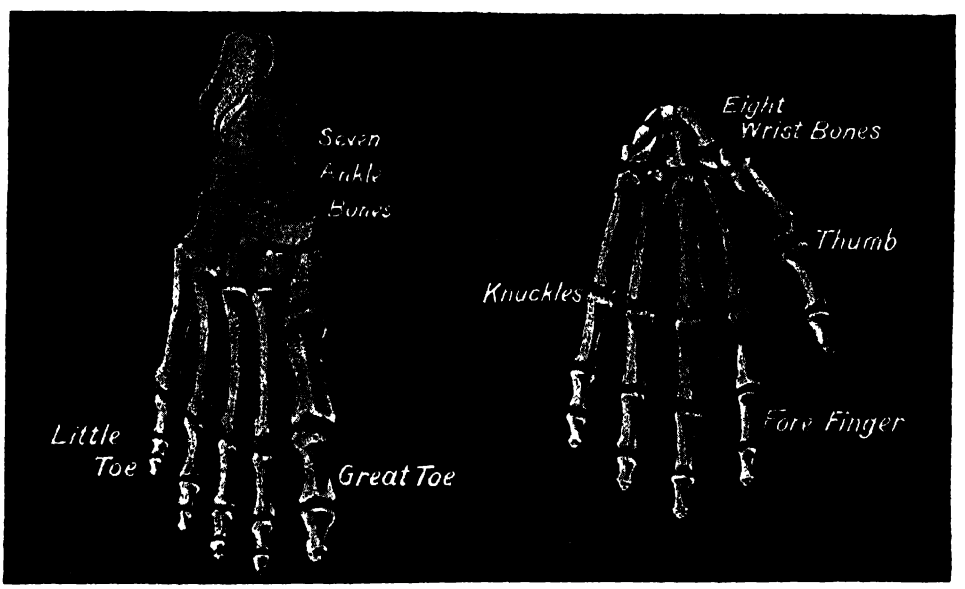
We can move a finger in only one or two directions, but this section of the hip-joint shows the ball-and-socket plan which lets us move our legs in all directions.

Much more important is the shoulder-blade, the great ridge on the back of which can be felt in anyone. It is mainly a rather flat bone, lying nicely

moulded upon some of the upper ribs. The most important part of it is a rounded socket into which fits the head of the bone of the upper arm. This makes a "ball-and-socket" joint, and the great feature of a ball-and-socket joint in a piece of machinery, and in our bodies, which are so much older than lifeless machinery—and have, of course, made all the lifeless machinery there is—is that it can move in any direction. You can move a finger-joint or the knee-joint in only one or two directions; but the shoulder-joint, and the hip-joint, which corresponds to it, are ball-and-socket joints—a very good thing for us.

jointed. Beyond the wrist we find five little long bones (of course, you see why we call them long, though they are so little); and the first of these has *two* bones beyond it, making the thumb, while the other four have each *three* bones beyond them, making the four fingers. We sometimes talk of thumb and four fingers, and sometimes of five fingers, as when we say "five-finger exercises" for the piano; and it is rather confusing.

Everyone can see for himself or herself that the thumb has one piece of bone less than the other four parts into which the arm is split at its end. But have you



These are the bones of the foot and hand, each with the same number of bones. It is by the power of bringing the thumb opposite the fingers, which no other creature possesses, that man can make such wonderful things.

Perhaps you may care to remember that the bone of the upper arm is called the *humerus*, not "humorous," remember. Some people say it is called that because it is near the "funny bone," but of course that is only a joke.

The forearm has two bones; they lie side by side when we stretch out the arm with the palm of the hand uppermost. When we turn the hand over on to the palm, the outer bone crosses over the inner bone. At the elbow both bones are jointed to the humerus, and a very wonderful joint that is, though not so wonderful as the knee, which, of course, corresponds to it.

Then comes the clever wrist, with its eight little pieces of bone all wonderfully

noticed that the same is true of your great toe?

In some creatures the fingers or toes are webbed; in the duck, for instance. But have you noticed that our fingers are partly webbed, too? Lay your hand on its back, and look at the length of the fingers, and then lay it back upwards, and look at their length again. Then you see that our fingers are a little webbed on the palm side. That makes the palm a little bigger, and helps to prevent things from slipping out of it between the fingers. The toes have the same arrangement.

A whole book, and a very famous one, too, has been written about the wonders of the human hand. Here we can only notice the greatest of them. It is that

the thumb can be *opposed* to the fingers, so that it is quite easy to touch the tip of the little finger with the tip of the thumb. The importance of this for the life of mankind is *enormous*. It means easy grasping, and that means *writing*, and many more things. In all the animals, except in those which are nearest to us, the thumb is not *opposable* any more than the great toe is in us, though the great toe is opposable in some animals, so that they can use their feet as well as their hands in climbing.

We have already read about the ribs and the breast-bone; so now we can pass to the last part of the skeleton, and that is the bones of the lower limbs, or legs.

Just as in the case of the arms there are certain bones that lie between the backbone and the long bones of the limb itself, so in the lower limbs we find certain bones of very great strength and importance, which are firmly jointed together to form a sort of basin. This is called the *pelvis*, which means basin. It is built round the lower part of the backbone; and you can feel the edge of the basin in your side.

THE HIP-JOINT WHICH IS POWERFUL ENOUGH TO RESIST ALMOST ANY SHOCK

On each side of this basin, outside it, we find a very deep and very strong socket for the head of the hip-bone to fit into. This is very many times stronger than the socket the upper arm-bone fits into, because the hip-joint has to do with walking, and its strength has to be tremendous. It will stand very nearly anything before it will allow itself to be disjointed.

The thigh-bone, corresponding to the upper arm-bone, is the longest, biggest, and strongest in the body, and at its lower end is the knee-joint, the largest and most wonderful joint in the body. though, unfortunately, not quite perfectly fitted yet for a creature that walks upright, and therefore it is very apt to undergo injuries, and terribly liable to be attacked by disease.

The part of the leg below the knee has two long bones in it, like the forearm. But it is not necessary, or even desirable, that we should be able to turn the lower part of the leg right round, as we can do with our arms; and so only *one* of the two bones of the leg is jointed to the thigh-bone. That is the shin-bone. The other one, which lies along its outer side, is very slender, and its upper end is simply jointed to the large and strong upper end of the shin-bone. You can feel the little head of this outer bone in your own leg, lying well below the knee-joint itself.

THE EXTRA BONE OF THE LEG THAT IS EMBEDDED IN MUSCLE

The leg also has an *extra* bone, the knee-cap; but this is quite peculiar, as we should expect when we remember that there is nothing of the sort over the elbow-joint. The knee-cap is a bone developed inside the strong rope, as we may call it, of the muscles of the thigh, as they pull upon the shin-bone. This rope, as it passes over the knee-joint, has the knee-cap embedded in it.

The bones of the ankle differ from those of the wrist, as they have such different work to do; and the most notable is the bone of the heel, on which such great strain falls when we stand or walk. But more remarkable than any one bone is the way in which the ankle-bones form an arch, which gives spring and grace to the gait. This arch is beautifully supported by the rope, or sinew, of one of the muscles on the outside of the leg, for this sinew runs right under the ankle and braces it up. Another sinew on the inner side does much the same, and the two together form a sort of stirrup to support the arch of the foot. If the muscles get flabby and weak, the sinews get lax and the foot is apt to become flat.

THE GREAT TOE JOINT AND HOW IT IS TWISTED OUT OF SHAPE BY OUR BOOTS

The bones of the foot exactly correspond to those of the hand. The foot, lastly, contains the most constantly abused joint in the body—the joint of the great toe. The bones of the foot are so arranged that the inner edge of the foot is meant to be straight, as it always is in a baby; and the great toe should move up and down in a straight line pointing forwards. We wear boots and shoes which turn the great toe outwards, and compel its joint to work thus twisted out of shape. People who have gout know the result—which is that this poor joint is more liable to cause intense pain and suffering than any other joint that we have in the body. The fault is not the joint's, but ours.

THE NEXT PART OF THIS IS ON PAGE 2647.

WHAT THIS STORY TELLS US

NO subject is more interesting to boys than the story of the Indians. Here you will find an account of the Indians of Canada in early times, their appearance, their daily life, their sports and games, their religion and superstitions and their methods of warfare. Though their numbers are much less than two hundred years ago, there are many Indians yet living in Canada. Thousands of the children are in school and seem to be making excellent progress. Some are becoming prosperous, especially those who live in the Province of Ontario, though generally they dislike to work continuously at any task.

THE INDIANS OF CANADA

PART I

CONTINUED FROM 2506

THE term Indian was first applied to the natives of North America by Columbus. When he reached the Bahamas in 1492, he believed that he was near the shores of India, and he named the people he saw there Indians. Since that time the term has been used to designate the first inhabitants of America. When the first explorers and discoverers came to Canada, in the early part of the sixteenth century, they met with various Indian tribes or nations. Each tribe was a small republic in itself, presided over by a chief, whose power depended on the opinion the members of the tribe held of his strength and skill and wisdom. The most important peoples in Canada were the Algonquins and the Iroquois. The former was the chief central race of early Canada, and extended in scattered masses from the Atlantic Ocean to Lake Winnipeg, and from North Carolina to Hudson Bay; the latter lived in the territory now included in Ontario and Quebec, and also in what is now New York and North Carolina. Next in importance were the Hurons, though they seem to have been of the same stock as the Iroquois. These three divisions were the first with which our ancestors came into contact.

WHAT THE INDIANS WERE LIKE WHEN OUR ANCESTORS CAME

Although each tribe had its own peculiar characteristics, on the whole the methods and habits of all were similar, and many customs and traits were common to all.

The early Canadian Indians were tall and straight and slender and agile in form, with dark olive-colored skin bronzed by exposure to the weather. Their expression was always stern and sombre, and seldom gave evidence of their true feelings. The cheek-bones were high, the eyes small and keen; the forehead was narrow, the lips thick, the nose flat, the hair very black, long and coarse. Their senses of sight and hearing were very highly developed, so highly that they impressed the first European explorers as having almost supernatural power.

When the white men came to Canada, the Indians dwelt in small roughly built lodges or huts. The less advanced tribes lived in movable wigwams or tents shaped like a cone or bell. These were built of ten or twelve poles of varied length, according to the height of the tent; the poles were fastened at the top, and stretched on the ground in a circular shape; a covering of bark or skins of animals was then placed on the outside of the poles, fastened with pegs, and weighted to the ground with stones. A hole large enough to let a man enter on hands and knees served as an entrance, and a flap of skin or bark made the door. The smoke of the fire passed out through an opening in the top of the tent. Many Indians to-day—particularly in summer—live in wigwams similarly constructed.

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How the Indians Dressed When the White Man Came

The clothing of the Indians was made from the skins of animals killed in the chase. At a very early period they discovered the art of dressing or tanning skins. In their dress they always showed a love for adornment, and this characteristic still remains with them. Their garments were highly decorated with paint or dye made from plants or berries, and with bright-colored shells. Their faces and bodies were frequently daubed with paint, especially before setting out to war. The braves, and the other important men of the tribe, decked their heads with the feathers of the hawk and the eagle, and both men and women wore ear-rings and bracelets made of bone or shell, teeth of the deer, claws of the bear, or other parts of wild animals. They were quite skilful in ornamenting their deerskin garments with the quills of the porcupine.

Before the coming of the white men, the only weapons the Indian possessed were the arrow, the tomahawk, and a kind of knife or battle-axe. The arrows were tipped with stone heads, and the tomahawk, the knife, and the axe were of stone. Specimens of these old weapons are seen to-day in museums, and are sometimes dug out of the ground on the site of old Indian encampments. They were made in the same way that our ancestors of the stone age made their weapons and tools of stone, when they lived in caves in Great Britain and in Southern France and in Spain.

Wars between the tribes were of frequent occurrence. These arose from an invasion by one tribe of the territory belonging to another, or from the capture or slaying by one tribe of a member of another.

Indian Methods of Fighting Before They Obtained Firearms

When it was decided at a council of the braves to go to war, weapons and garments were carefully prepared. The bodies were painted in a hideous fashion; dances and feasts were held to propitiate the gods to give them success; there was much boasting of their valor by the older men in order to put courage into the young and untried warriors. Although under a war chief or leader, the warriors fought independently. They fought with clubs, and spears, and arrows. Open fighting, however, was not always in their code; they trusted rather in a secret and sudden surprise, and from an ambush behind rocks and trees their arrows came silently, as if from the sky, upon their unsuspecting foes. The scalp of the fallen enemy was removed and treasured as a trophy of victory, and the power and skill of a brave was measured by the number of scalps in his wigwam. Sometimes the skulls of victims were likewise treasured. When the warriors returned from the battle, feasting was renewed, the scalps of the slain were stuck on poles, and the tribe danced the weird scalp dance to the noise of the "tom-toms" or drums beaten by the squaws; if they had brought back prisoners, there followed the terrible tortures of the captives, who seem always to have borne their suffering with stoic calm. Sometimes women of the tribe who had lost their own children took pity on captives, adopted them, and made them members of the tribe. Thrilling stories are told of white children, and even grown men and women who were adopted and afterwards escaped. Sometimes children who were carried off by Indians in early youth grew to love the wild life and refused to return to their friends.

How the Indians Got Their Living

The chief occupation of the Indians was hunting or fishing, but these pursuits were followed only at intervals, and long enough merely to provide food. In the wild free country where game was abundant, the Indian could kill an animal or catch fish for his meal without difficulty, and as a result he gave little thought to the future. He lived from "hand to mouth," for his food was always near,—in stream or forest. He has never outgrown this characteristic. To capture wild animals he had primitive traps; he used also his arrow and his spear. For crossing the snow-covered fields, either of forest, wood or prairie, he used snowshoes,—a broad frame covered with a network of leather thongs which kept him from sinking in the snow. On these, which he used with great skill, he easily caught the deer and the buffalo floundering in the deep snow, and killed them with his club or hunting knife. From the bank of the stream he speared fish; sometimes at night he placed a birch-bark torch-light in the bow of his canoe,

INDIANS WHO LIVE MUCH AS THEIR ANCESTORS DID



Though this is a modern picture, the "traverse," as this clumsy carriage is called, was used by the Indians as soon as they gained possession of horses, which was not until after the white men came. The horse is fastened between two poles, the ends of which drag on the ground. This is Kenepequoshes (Son of a Snake), a Cree Indian, with his squaw and papoose, at their home in Alberta.



The surviving Blackfoot or Blackfeet Indians are found both in Canada and the United States, and this picture made on the Canadian side shows how they live. Their tepees are usually covered with canvas, and to the left you can see the framework of one from which the covering has been removed. Their horses are grazing on the prairie. The origin of their peculiar name is not certainly known. Photographs by Notman, Montreal.

and when the fish, as they always do, rose to the light, he easily speared them. In the autumn, before the Indians settled in their winter quarters, the great annual hunt was held. The meat of the animals was smoked or dried in the sun and put away for use on days when the weather would not permit hunting. Great quantities of fish were cured in the same way, and on the Atlantic coast, in the Maritime Provinces, shell fish—oysters and clams—were piled on the shore in great heaps for winter use by the tribe. Remains of these are still found in many places.

The people generally shared alike, and there was little or no individual ownership other than of personal belongings. Some of the more advanced tribes cultivated Indian corn in little garden plots; from the meal or millet of the corn, which they ground between stones, they made a coarse bread, and this frequently saved them from distress in the absence of game. By drilling with sharp-pointed sticks or striking sparks from two flint stones, which they always carried, they lighted the inflammable birch-bark or punk and kindled fires. This was difficult except in the hands of skilful fire makers, and fire was usually carried with care by the old women from one place of encampment to another. Their utensils—the few they possessed—were of stone, and some very good specimens of their pottery are still found in different parts of Canada. Buckets or cups were made from birch-bark or leather. Most of the meat was cooked. It was boiled or roasted on "spits" or sticks in the fire. Birds were roasted or baked in a bed of ashes or live coals; a common method of baking was to enclose the bird or the meat in a ball of clay and then place the ball in a bed of hot ashes. Eggs were boiled or baked in ashes. Cereals were boiled or roasted or parched, and corn was roasted on the ear. Water was heated by ordinary methods or by putting into it numerous stones made red hot in the fire; the birch-bark vessel would be scorched, but would not be burned when put over the fire with the water already in, if the fire was a bed of live coals.

SOME CUSTOMS WHICH SEEM STRANGE TO US

The Indians had many strange methods and customs, a few of which they still retain. The mother carried her infant child on her back; she placed him in a moss-bag made of fine clean moss, wrapped the bag in a small blanket or skin ornamented with shells or colors, and fastened it to her shoulders. Boys were much more welcome than girls because they could become warriors and fight. Children were seldom, if ever, punished for wrong-doing; but they were—and are still—very obedient, and had great respect for their elders. The father's word was always law in the household.

Funeral customs differed in detail among different tribes, but there were many that were common to all. The burning of the bodies was practised among some of the tribes. Among others, the body was wrapped in a blanket or a hide, and placed in the crotch of a tree, or on a scaffold several feet high, where the wild beasts could not disturb it; there it was left, and the spirit of the wind or the storm was given charge over it. It is said that they believed that the rain falling from the heavens would cleanse it from its sins, and hasten its arrival in the Happy Hunting Grounds. Indians who practised this custom held a Feast of the Dead, once in twelve years, when bodies were brought from far and near and buried in one large grave. The grave was lined with new robes and beaver skins and gifts to the dead were buried with them. Sometimes a hollow log was used as a coffin. Other tribes placed their dead in strongly built stone huts,—the houses of the dead,—securely fastened against the beasts of the forest. These were placed at a considerable distance from the village, that the spirits of the dead might not harm their enemies in the tribe. To these huts came to visit at times the relatives or friends of the departed, for the spirit was supposed to linger there; sometimes highly prized trinkets or possessions were left there to make the dead happy. The remains of these huts containing bones or skeletons are still found.

REMAINS OF THE MOUND-BUILDERS, AN ANCIENT INDIAN RACE

In the region to the west of Lake Superior, and in the central Northwest, there are many mounds which tell of the old Indian race. They are built of earth, but sometimes contain layers of stone and wood. Usually they are circular in shape, from six to fifty feet high, and from thirty to one hundred feet in diameter. They are generally found on cliffs or other

points of vantage, and while they were perhaps used at first for purposes of observation or defence, they were also undoubtedly used as burial places for the builders. They usually contain skeletons, most of them in a sitting posture; others contain the dust of skulls and bones. A chief or a man powerful in the tribe was always buried on an eminence or in a secluded spot, selected apparently for its beauty and impressiveness. The Indians always placed beside their dead many things they thought would be of use in the great Spirit Land to which the dead had gone; these included various articles of food, tobacco and pipe, bow and arrows and other weapons and utensils, some of the treasures of the deceased, his dog, and gifts from friends. They believed that the dead were happy, and that the Spirit Land was a place without pain or hunger or weariness.

Some again thought that the place to which the dead had gone was a land of "little people,"—a land of the ever-young,—where the spirits were always at play and none ever grew old. Some of the Blackfeet of Alberta still believe that the spirits of the dead exist somewhere near the Sand Hills. To them the future life is one not of happiness, but of indifference. The people of the Spirit Land, they think, lead the life of ghosts, and are surrounded by illusions. For example, they are always hunting buffalo or other animals, which, followed for a while and almost captured, suddenly vanish and leave behind in their place for the hunters only skeletons of little mice.

THE RELIGIOUS BELIEFS OF THE INDIANS

The religious beliefs of the Indians were strange, and they varied but slightly among the different tribes. They all worshiped something, the spirit of good or of evil, the spirit of the day or the night, sun or moon or stars, the spirit of the storm, or of the mountains, or of the water,—the lake, the sea or the river. Usually they believed in one great good spirit, whom they called "Manitou,"—the "good Manitou,"—and one great evil spirit,—the "evil Manitou." But each man frequently had his own god whom he worshiped in silence and secrecy. All the tribes had their own peculiar stories of the creation of the world, and the origin of man and of animals was explained in strange ways.

They also had tales of a great deliverer who came to clear the forests and the rivers and the fishing grounds, to free the world from evil, and to teach the arts of peace. Among some of the tribes, this great personage was looked upon as the creator of the world and everything it contained. The imaginative minds of the Indians led them very far in superstition. Every sound in the forest, every call of bird or animal, every ripple of stream, or moan of wind, or creak of tree, or rustle of leaf was to them a voice speaking of good or evil fortune to come. Giants and monsters, good or evil, peopled the earth and the water and were lords of part of it. Some tribes believed in the existence of "little people," like fairies, who lived among the hills or trees, and had great power of good or evil over mankind. Some could not eat certain kinds of flesh, because they believed they were descended from the particular animal the flesh of which was thus prohibited. The fiercer the animal ancestor, the greater was the courage of the descendant. Many of these old beliefs still linger among the Indians to-day.

THE SUN DANCE AND ANIMAL WORSHIP

Among the tribes of Western Canada, the great religious rite was the Sun Dance, for the worship of the power of the sun was one of the chief elements in their religion. In this dance the whole tribe took part. Sometimes during the "dance" young braves were raised to the rank of warriors; this was done by piercing the muscles of the chest, tying thongs through the opening, and lifting the youth above the crowd; if he endured this painful test, he was henceforth called a warrior. Sacrifices to animals were not uncommon among some tribes, in order that some of the animal's power might be transmitted to man. As the Indian looked about him, he saw animals possessing power that would be very useful to him, and he thought that by offering sacrifices and prayers he might receive some of that power. For example, he saw that the owl had great power over darkness, and could see in the blackest night; he sometimes made sacrifices and prayers to the spirit of the owl, hoping that some of this power might be transmitted to himself by this act. He did the same with the sun and the moon.

THE NEXT STORY OF CANADA IS ON PAGE 2781.

INDIANS OF THE FAR NORTH



The Indians of the far North are fishermen, hunters and trappers. During the winter they live farther south and west, but move up into the Hudson Bay region in the summer to fish and hunt the caribou. Some of them engage in trapping. You see by the wigwam that they have no permanent homes. You get a better view than usual of a bark canoe, which is light to carry.



Here is a whole family landing at their summer home. Unfortunately the white man's clothes destroy the picturesqueness of the Indian. Though they are on Hudson Bay the climate is not cold in the summer, but is really very pleasant. When the frost comes they will fold their wigwams and move toward the South, where they will remain during the long winter. Sometimes they have trouble in finding enough to eat.



PLANTS ANYWHERE AT ANY TIME

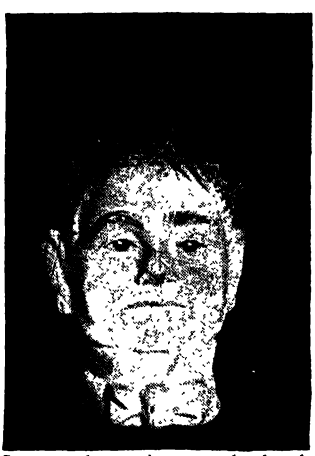
CONTINUED FROM 2523

WHEN the days are fine and bright, there will always be plenty to do in the piece of garden which is one's very own. In rainy weather, and during the winter, those of us who love to grow plants seem to be separated for a while from our treasures. There is no reason why this should be so, for, with a little care, we may easily have an indoor garden that we can enjoy all the year round.

Now, most plants, of course, grow in soil; but there are a certain number which may be kept alive without any earth at all, if they can have plenty of fresh water. These plants are just what are wanted for an indoor garden, as there is no need to use any mold, which is dirty stuff to have in the house.

The best plan for the garden without soil is to get permission to use a table or a shelf near to a window; and in order to prevent the water from spilling on the floor, it is just as well to have one or two large trays on which to place the plants.

It is very interesting to sow various kinds of seeds in the indoor garden, such as canary-seed, cress, or linseed. For this purpose clay shapes can be purchased at a florist's shop. These are sometimes made in the form of a man's head, or a pig, and are very quaint-looking. The idea is to sow the seeds on the roughened part, and in this way, when the little plants are grown, to give the object the appearance of having long, upright green hair. The shapes are hollow, and must be filled with water.



Cress-seeds growing on a clay head.

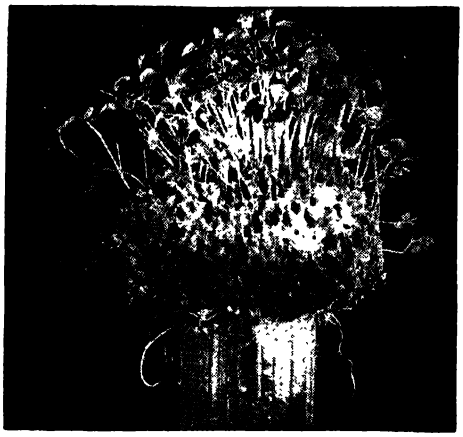
The best way to sow the seed, which is bought in small packets, is to place a little in a teaspoon, and then to shake it over the rough surface. As the water will soak through the clay, the shape must, of course, be filled up afresh every day. Another way of growing small seeds is to borrow a sponge—a good big one if possible—and, after soaking it in water, sprinkle the seeds fairly thickly over the surface. If we want the seeds to grow quickly, we keep the sponge in the dark until the little plants appear. We then put the whole thing in a light place and keep it watered every day, or let it stand on a tumbler of water, and soon the sponge will be covered with bright green plants. If the sponge is not allowed to get dry, the seedlings will last for quite a long while. We may use a piece of thick flannel instead of a sponge, and it will do nearly as well as the other.

Some of the most curious plants for our indoor garden are those which are known as Resurrection Plants. They are called by this name because, when they are in a dry state, they look just as if they are dead, but if they are placed in water they become green and alive. Everybody who has a garden without soil should try to get one or two of these plants, for they can be easily purchased.

When you receive your first Resurrection Plant you will think that the dealer must have sent you a dead plant in mistake, so dry and withered will it look. Do not make up your mind, however, until you have followed the directions which are given here. Get a bowl, large enough in size to take the plant, and fill this with warm water. Now take your plant and put it into the water, pressing it down, so that it will become well soaked. Next put the bowl in a warm place, and leave it for a few hours.

When you come back you will find that the dead-looking Resurrection Plant has expanded into a beautiful green one, which is wonderfully fresh and alive. The plant is now quite ready for taking to the indoor garden, where it may be put in a saucer of water. It will keep green as long as water

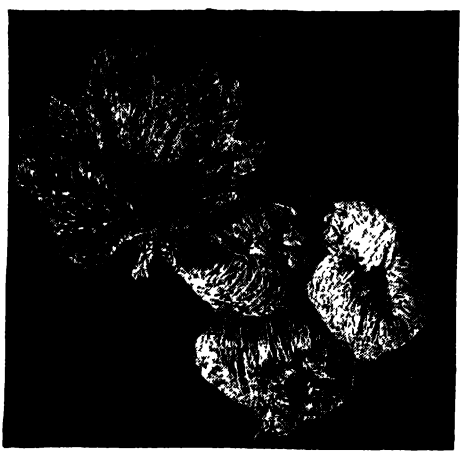
is supplied, but it is not wise to allow the plant to grow for too long a period at a time. After a week or so the Resurrection Plant must be dried off, and allowed a month's rest, when it may be soaked into life again.



A bed of cress growing on a wet sponge.

Many kinds of plants will root and grow for a long time in plain water alone. One of these is the spiderwort, a variegated plant often seen in cottage windows, which will live and send out a lot of roots in a glass bottle. Sprigs of ivy can be made to do very much the same, and there was a lady who decorated her fireplace in the summer in this way. The shoots of ivy were placed in jars of water, and sent out many roots.

In January, if small branches of some of our flowering trees, such as almond or wild cherry, are gathered and kept in vases of water in a warm place, they will come into full blossom long before their natural time.



The Resurrection Plant, that seems to be dead and withered, but comes to life again in warm water.

In all these cases it is necessary to keep the water in the jars quite fresh, and this will be more easy if a piece of charcoal is put into each.

An interesting curiosity, which will do well for our garden without soil, is the arum from India, called the Monarch of the East. Bulbs of this strange plant can easily be obtained from the seedsman at a small price. It is quite one of the most remarkable plants in the world, for it will produce its great flower not only without any soil at all, but without water either.

The only thing we need do is to place the bulb, when we get it, in a light position, and simply leave it. If the room is nice and warm, it will not be long before the bulb will send up a long shoot, which quickly grows into a most magnificent flower, sometimes two feet long. This is all colored in crimson and yellow, and bears a long red spike. The best time to buy the bulb is about January.

If we want the bulb of this arum to live after it has flowered, we must plant it in earth, in a pot or out in the garden. After a while, in place of the great flower, will be sent up a giant leaf, which is really very handsome. At the end of the summer the bulb may be taken



Spiderwort growing in water without any soil.

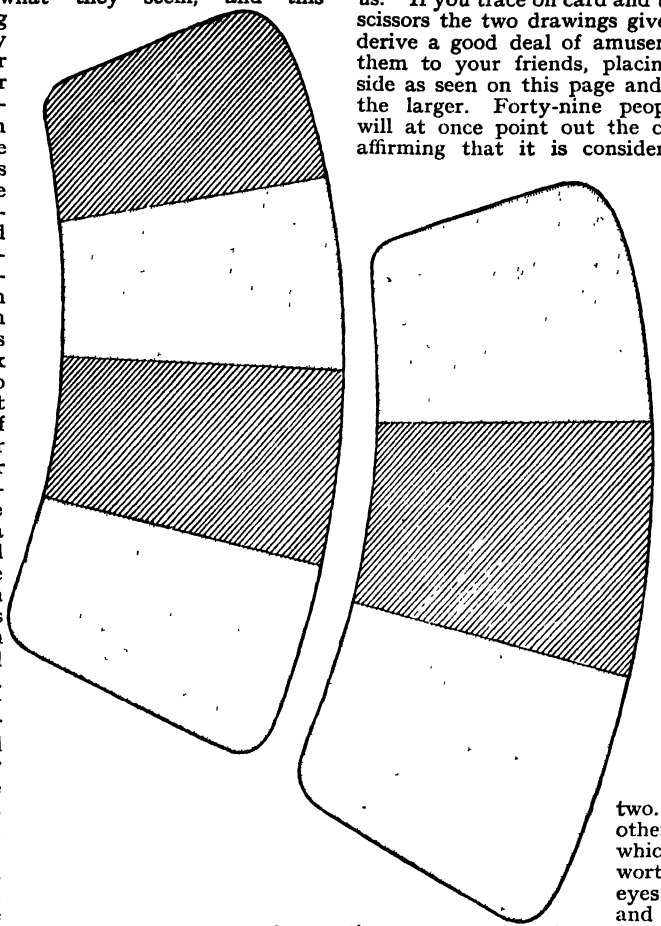
up and allowed to become dry, and then it can be put into its place once again, ready for flowering once more.

There are many other things which we might put in our garden in the house. Most children know that an acorn will grow into a fine little oak-tree if it is placed in a narrow-necked bottle which is kept well filled with water. In the same way, snowdrops and the dainty little blue scillas may be grown, and give us some gay flowers for the indoor garden. When we are out in the woods, we may gather portions of the bright green mosses, and these will live for many weeks if put into saucers containing a little water.

By getting together a collection of these different plants that do not require soil, quite an interesting indoor garden may be made, and this may become really pretty if the plants that form it are daintily arranged.

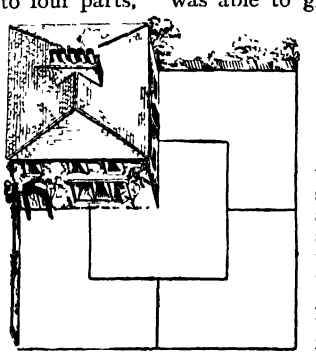
PUZZLING CARDS: WHICH IS THE LARGER?

AN old proverb says that things are not always what they seem, and this is something everybody finds out for himself sooner or later. Especially in regard to the size of things our eyes are prone to deceive us, and are particularly untrustworthy when we ask them to give us details. Ask any friend to point to a spot on the wall of the room or upon the door that would indicate the height that a silk hat would be if it were placed upon the floor. It is almost certain that your friend will touch a spot very much higher than the real spot. Probably he will indicate a point about twice as high as the hat will actually reach when it is placed on the floor. There are many other ways by which we can prove how deceptive are our eyes. Here we have an interesting proof of the tricks that our eyes play us. If you trace on card and then cut out with scissors the two drawings given here, you can derive a good deal of amusement by showing them to your friends, placing them side by side as seen on this page and asking which is the larger. Forty-nine people out of fifty will at once point out the card on the left, affirming that it is considerably the larger of the two. You may then ask your mistaken friend to say if he can tell by how much it is larger than the smaller one, and he will probably say that it is about one-fourth or one-fifth larger than the other. As a matter of fact both pieces are quite the same size. There are two things that assist each other in deceiving our eyes; one is the shape and position of the two pieces side by side, and the other thing is the markings on the two. There are many other devices by which the untrustworthiness of our eyes may be proved, and we saw some of them on page 112, but none of them is more striking than the one given here.



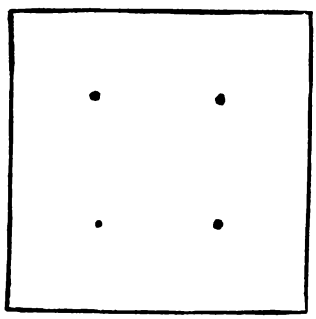
HOW THE FATHER DIVIDED HIS GARDEN

ON page 2522 is the problem of the garden which had to be divided into four parts, each equal in size and shape to the others. The birdseye view of the garden here given shows us exactly how it appeared after being so divided. In order to solve the problem we must set to work like this: First, we must make a tracing of the house and garden. Now, we know that the house stands upon one quarter of the whole ground, so if we continue the sides of the house we shall divide the garden into three equal squares. Next we divide each of these squares into four equal squares and we have the garden divided up into twelve small squares, all equal By taking three squares for each child, the father was able to give Harry and Leslie and Doris and Gertrude each a plot of ground of the shape shown in our picture here. We can see at a glance that each piece is equal in size and shape to the others, but if we divide the garden in the way described here, we not only get the correct solution, but are able to see how and why the plots of ground are equal. The boys and girls were very much interested in their father's division of the garden, and they agreed that although at first they had thought it difficult and almost impossible to divide the ground into parts of equal shape as well as size the solution was really simple.



THE MYSTERIOUS PAPER PURSE

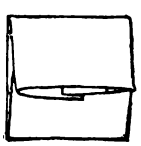
THE young conjurer borrows a dime. Taking a piece of paper about four inches square, he lays this on the table, puts the coin in the centre, and folds down the sides over it. There is "no deception" so far; the coin is honestly wrapped in the paper. Picking up the little packet, he asks someone to blow upon it, or does so himself. When he again opens the paper the dime has disappeared, and the owner probably begins to wish he had not lent it. But again the young wizard folds the paper. Once more he blows upon it, and once more unfolds it. The dime has come back, and the owner of the coin looks quite cheerful again.



1. Paper marked for folding.

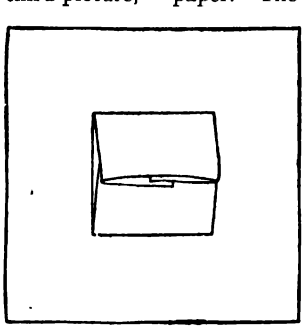
We hear it said of a boy sometimes, that he "is not such a fool as he looks," and the same sort of remark might fairly be made about our simple-looking bit of paper. It is not quite so simple as it appears to be; in fact, it is a "trick" paper, specially arranged for the purpose of this feat. The young conjurer may find some amusement in preparing such a paper for himself. To do so, he should proceed as follows:

Take a half-sheet of ordinary notepaper and fold it in two. Then, with a sharp needle, make four little holes through both thicknesses of the paper, two inches apart, so as to form a square, as shown in our first picture. Then cut apart the two portions of the paper, and fold down the edges of one of them towards the centre, using the needle-marks as guides. The paper thus folded will form a sort of little pocket, or envelope, as in picture 2. Paste or glue this in the centre of the other paper, exactly between the needle-marks. The two together will now look on the one side like our third picture, but on the other side like a plain piece of paper.



2. The folded paper purse.

This last is the side which, in performing the trick, you show to the company, taking care, by the way, not to show it with a light behind it, which would give away the secret. You then lay the paper, with this side uppermost, on the table. Having placed the coin on the paper, you fold down the edges over it, again using the needle-marks as guides, so as to make the folding correspond exactly with that of the pocket on the other side. The paper will now in reality form two such little pockets, back to back, but if you have done your work neatly, no one will notice that such is the case. In the act of offering the paper to be blown upon, you turn it over so that when you again open it, it is the empty side that you open. When it is blown upon for the second time, you again turn it over so as to bring the side in which you placed the sixpence uppermost.



3. The back of the paper as prepared for use.

You must, of course, not let the company perceive that you reverse the paper. To do this in proper conjuring style, you should hold it in the first instance clipped between the first and second fingers of the right hand. As you offer it to be blown upon, you must push it upwards with the thumb and clip its outer edge between the thumb and forefinger, when it will have performed an imperceptible somersault. The turn over should be made with the arm in motion, when the greater movement will conceal the less important from the spectators.

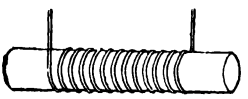
The dime is brought back again by a repetition of the process. Of course, you are not bound to use a dime. Any piece of money, or a bone counter, may be substituted, according to the effect you desire to produce. Further, you may use the paper not only to "vanish," but to change one thing into another. For instance, in order to change a dime into a nickel, you have only to place a nickel beforehand in the pocket on the reverse side of the paper.

You may use the same paper more than once if you please, but it will in such case show by the creases that it has been previously folded, and the effect is scarcely so good as with a freshly prepared piece of paper.

The method above described is the simplest form of the trick. You may improve it considerably by using three pieces of paper instead of one. One of these must be rather smaller, and the other larger, than the trick paper. The smallest one we will call No. 1, the trick paper No. 2, and the largest paper No. 3. The first and last are mere plain pieces of paper, but you must have an exact duplicate of No. 1, and place this beforehand, properly folded, in the pocket of No. 2. When you work the trick in this manner you should, in a careless sort of way, show both sides of No. 1 before wrapping the coin in it. This done, you place this paper, with the coin in it, in No. 2, and then this latter in No. 3, first, however, turning it over as described. The trick is now done. When you come to No. 2, it is the empty duplicate of No. 1 that you find therein. This you should hand to someone else to open. Nos. 1 and 3 being obviously mere ordinary bits of paper, no one will suspect that No. 2 is a fraud

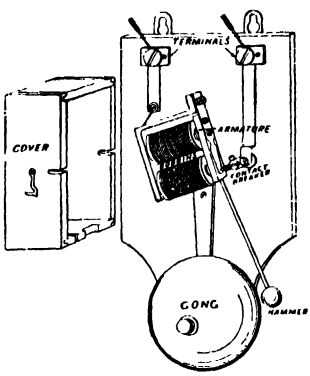
FITTING AN ELECTRIC BELL

TO most boys the working of an electric bell appears to be a mystery, because the connecting wires do not move, as they do with an ordinary pull bell. But it is really very simple, as we shall see in this article. You must first of all have a battery, preferably a Leclanché, like the one described on page 1099, to make the electric current. Now, this current rings the bell by means of magnets which are formed from iron rods, wound round with wire. You can make a simple electro-magnet, as it is called, like that in picture 1. Get a little piece of iron rod—not steel—and coil some cotton-covered bell wire around it, leaving sufficient at each end to attach to the terminals of the battery. Secure one end to a terminal on the battery, and hold the other in your hand; then let this loose end touch the other terminal, and you will find that the iron rod is turned into a magnet, able to attract and pick up other bits of iron and steel. But directly you pull the loose end of wire away and so break the current, the rod loses almost all its magnetic power. If you were to use a hard steel rod, this would retain a good deal of the magnetism imparted to it by the current flowing around the coils of the wire, and become a permanent magnet. This kind of magnet, however, is not suitable for use in making a bell.



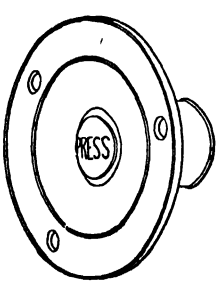
1. An electro-magnet.

Looking now at the bell, as illustrated in picture 2, you see the gong, by which the sound is produced, when struck by the little hammer on the end of the bent wire. The current comes from the battery to the two terminals attached to the baseboard of the bell, and passes down the brass strips connecting the terminals to the wire on the bobbins at one side and to the little pillar or "contact-breaker" on the other This pillar has a screw, tipped with platinum, which does not get oxidized or dirty, exactly opposite another spot of platinum on the tail of the flat spring which we have already seen carries the armature. The wire from the bobbins, on the left-hand side, goes up to the end of this spring, so that, if the two platinum surfaces meet, a complete circuit takes place. Now a peculiar thing happens, due to the adjustment of the flat spring, which is set so that the platinum bits just meet The moment the current is turned on, the two bars inside the bobbins, together with the frame to which they are fastened, become magnetized; and the armature jumps like lightning towards the magnets, making the hammer strike the gong. But the flat spring has now moved away from the platinum-tipped screw on the contact-breaker, so that the contact is broken, the current does not flow, and the bobbins fail to magnetize the bars within them. What happens, of course, is that the armature falls away under the persuasion of its flat spring. But still it has no peace, for the platinum surfaces meet again, and the same action occurs. These to-and-fro movements are very rapid, so that you can understand why the bell is called a "trembling" bell. These bells can be bought from twenty-five cents upwards. Some of the smaller ones are made entirely of metal, instead of having a wooden baseboard and cover, and more elaborate ones may be had nickel-plated.

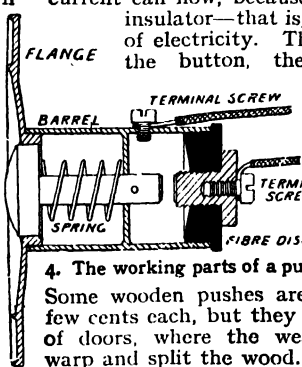


2. Parts of an electric bell.

It is necessary to have some means of easily making and breaking the current between the battery and the bell, so that one can make the latter ring when desired. This is done by a "push," which in the case of a house bell is fixed by the side of the front door for visitors. The push seen in picture 3 has a brass or china button in the centre, and the inside is made as shown in picture 4. The wires are brought, as seen, to two screws, one let into the side of the barrel and the other into the middle of the brass piece in the fibre disc. So long as the press stud is not touched no current can flow, because the fibre acts as an insulator—that is, it is not a conductor of electricity. The moment you press the button, the tail moves along and the two platinum faces meet, and the current passes.



3. The push.

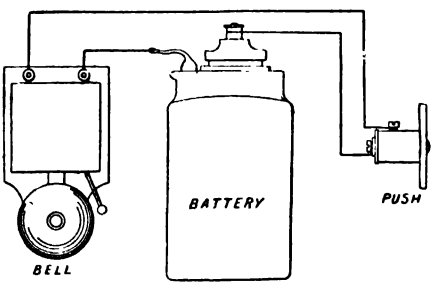


4. The working parts of a push.

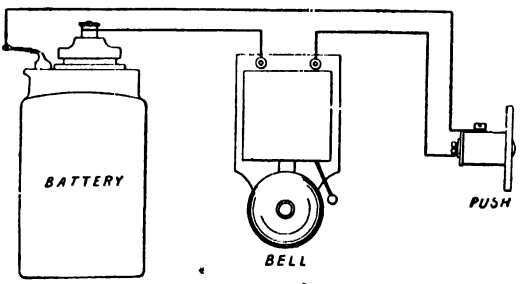
This kind of push is made all in metal, and is constructed so that the rain cannot get in. Some wooden pushes are very cheap, only a few cents each, but they would not do for out of doors, where the weather would quickly warp and split the wood.

The only other thing required in connection with the outfit is a supply of wire, to connect the battery, bell, and push. Copper wire is used, and it is insulated, being covered with plaited cotton over a thin layer of rubber. The wire is tinned to prevent oxidation, and the cotton covering is soaked in wax to render it proof against damp. We have observed in the pictures of the bell that there are two

terminals each on the battery, the bell and the push, and these must be coupled up with wire in such a manner that a continuous circuit, or course, is formed for the current to pass when the push is pressed. It does not matter which is nearer the push—the bell or the battery. Pictures 5 and 6 show two arrangements, with black lines representing the wires connected with the terminals. When the push is pressed the circuit is completed, and the current from the battery passes throughout this way, ready for installation. Having the bell, battery, and push, we must find the length of wire required, the best way being to take a ball of string and measure the distance with it. Start from the door where the push is to go, and run up inside the corner of the wall and along the angles of the ceiling, and round any corners to the place where the bell has to go, and then on to the battery. Allow two or three feet over for connecting up and possible errors you may make in measuring, and either



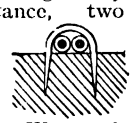
5. Arrangement of the bell system : the battery between the bell and the push.



6. Arrangement of the bell system : the bell between the battery and the push.

the system, causing the bell to ring so long as the push-button is held down.

In these drawings the parts are shown close together for convenience, but it must be understood that it makes no difference to the working if they are separated by a considerable distance, because the current goes through the wires readily. The battery, therefore, need not be placed close to the bell. Thus the latter is usually placed in a hall or back room, and the battery in any cupboard or on a shelf that happens to be handy. It must not be placed too high up, because the heat of the upper part of the room will dry up the solution too quickly. In some cases the bell and battery are mounted together on a little bracket. They can be purchased in



7. Wire staple.

measure the length of the string in yards, or take it to the electrical shop and ask for wire of *double* that length. This is because it has to go the distance and back again. Or we can buy " twin " wiring, which is composed of two copper wires, insulated from each other, and again wound round with cotton covering, forming only a single piece, which is more handy to fit up than the two separate strands. If we buy twin wire, it need be only the length of your string. Tinned staples, as shown in picture 7, are used to fix the wire to the walls and corners. Take care not to drive these staples in too tightly, or they will cut through the insulating material, and make a " short circuit " between the wires.

THE PUZZLE OF THE LAUGHING SAILOR

HERE is the portrait of a laughing sailor made up of lines and dots. Now, what is he laughing at ? Well, he knows that there is a puzzle to be solved in connection with his face, and he is laughing because he thinks none of us will be able to solve it. If we look closely at the portrait, we shall see that in several parts the string of lines and dots comes to an end in a single dot, as, for example, in the eyebrow and the ear, There are, altogether, six of these places where the lines come to an end Now, this is the puzzle of the laughing sailor's face. If we start at the big spot in the middle of the man's cap, counting that as number one, it is possible to move along the lines, counting the dots as we go, till we come to a twenty-fifth dot, and that dot to be the dot at the end of one of the lines like the eyebrow, where you can go no farther. There are several ways in which this can be done, and we can take them one after another, and, starting at the button in the centre of the cap, reach the dots where the lines end, counting only twenty-five dots in all each time, including the one where we finish and the big dot in the middle of the sailor's cap. Now let us see if we can do this, and in how many different ways it can be done. We do not want to spoil this book, so we will take a piece of tissue or tracing paper, and, putting it over the sailor's face, trace it. Then we can mark the traced copy. Be sure to remember that we count the big button of the cap where we start as the first dot, and we must always end at the twenty-fifth.

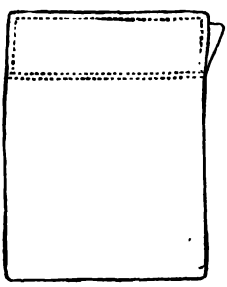


A USEFUL SHOE-BAG OF SERGE

WHEN we go out to tea at a friend's house, or to a dancing class, we find a bag of some kind useful for carrying slippers. It looks better than a brown paper parcel, and the shoes are popped into it in a moment.

If we make our own bag, we can shape it as we please, and cut it large or small according to the size of the shoes to go into it. One made in the style of the Dorothy bag with a running cord looks well; it costs little, for it can be made for less than a quarter, and is light and convenient to carry on the arm. If made of rather thick material the bag will keep out the rain.

The materials required are these: a piece of some fairly thick material measuring about thirty inches by thirteen inches, such as the green art serge, fifty inches wide; the same quantity of sateen for the lining—a suitable kind thirty-one inches wide is sold; one yard of twisted silk crape cord. Silk crape cord is the name for it, though there is no resemblance to crape.

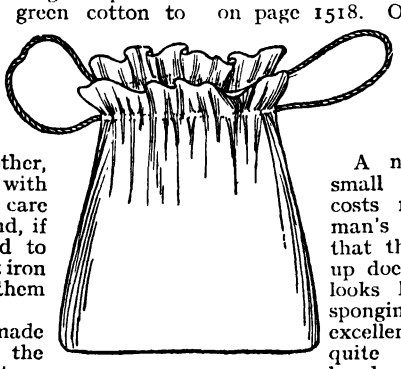


1. The bag ready for the running cord.

If we choose the green art serge for the material, the sateen lining might be of a golden brown color, and the cord to match.

We must remember that slippers are going into the bag, therefore a light, dainty color, such as cream, would be less serviceable for a lining than a darker one.

Having cut out the serge and the sateen, we fold the serge over in halves lengthways, wrong side outermost, join the sides together from the fold to about three-quarters or more up the sides by a stitched seam of rather small stitches, far enough from the edge to prevent fraying, using, if possible, green cotton to match. Then we fold the sateen for the lining in the same way, but, instead of making stitched seams up the sides, we turn in the rough edges of the sateen, and, placing one over the other, sew them over and over with close, neat stitches, taking care not to pucker the sateen, and, if it is at hand, using thread to match. The passing of a hot iron over these seams will make them lie flat.



2. The shoe-bag finished.

Now we have roughly made two bags, one of the serge, the other of the sateen. Let us turn the sateen bag inside out and then push the serge bag into it, taking care to fit it into the corners nicely, till the lining lies smoothly against the serge. It will be necessary to stitch the lining to the material at the bottom corners to prevent its being dragged out when the shoes are withdrawn from the bag; but we should not let the stitches show through the material.

The bag now has the lining outside and the material inside. The next thing to be done is to finish the top of the bag. First we turn in the rough edges of the serge and the sateen from the point where we stopped joining up the sides of the bags, and hem the sateen down on to the serge a little way from the edge of the flaps, so that the lining does not show when the bag is seen held upright.

Now the bag is ready for the running cord. There are two ways of running this into the neck of the bag. We may buy half a dozen bone rings for five cents a dozen and sew them at intervals along a line two or three inches from the edge of the flaps; then pass the cord through these and sew the two ends of it together. Another way is to make two running seams with green thread two or three inches from the edge of the flaps through the serge and the sateen, wide enough apart to leave room for the cord between them. The bag at this stage—lining outermost and ready for the running cord—is shown in picture 1.

If we have no bodkin with an eye large enough for the cord, we can tie a thread to the end of the cord, and use a bodkin to draw this through the neck, dragging the cord after it.

We now turn the bag right side out and it is finished, as shown in picture 2.

We have made, of course, quite a plain shoe-bag in which the shoes can be carried placed toe to heel and upright, so that they do not poke and get in the way when carried in the bag, as they might do placed flat along the bottom of it.

Many girls like to embroider the owner's initials on the bag. This can be done with *lustrine* or crewels in satin stitch as described on page 1518. Or we may form the letters with the cord by stitching it down to the material. In either case the monogram is worked on the serge before it is made into the bag.

A novel material for a very small shoe-bag, and one that costs nothing, is the silk of a man's old silk hat. The fact that the surface has been rubbed up does not matter, for it now looks like fine plush, and after sponging and heating makes up excellently, wears well, and is quite light for a little girl's hands. A scarlet sateen lining or red twill would do well for this little bag, and the effect is charming.

These little Dorothy bags are useful for all kinds of things. If they are made of soft satin, of some dainty shade, they may be used for a work-bag. Many people make them of a much smaller size, fit them up with needles, cottons, scissors, and thimble, and use them instead of a little work-basket. Such a bag is more handy than a basket, as it can be tucked away in a corner of a trunk.

CAN YOU TELL THE REASON WHY?

THE GAME OF "WHY IS IT?"

HERE is a game which may be played in a very similar way to those described on pages 2362 and 2523. A boy or girl should read out the descriptions, and the game is to explain the causes. A large number of the answers should be quite well known to readers of this book. They are, however, given on page 2720.

SHOULD THE RAILWAY LINES JOIN?

1. There is a little path across a meadow near our home. It leads down to a railway cutting, and, sitting on the stile at the end of the path, we can look down on to the railway lines. Yesterday some of us were waiting there to see the express pass, and we noticed that where two rails joined end to end they did not quite meet. There was a space of about a quarter of an inch between the ends. Could it be a mistake of the workmen who laid the rails? When the express had passed we looked out for the joinings of other rails. There was always a little space left; so it seemed to be done on purpose. Why?

THE PUZZLE OF THE LOOKING-GLASS

2. One day a little girl was sitting in the corner of a room on the same side as the door, so that when anyone opened it she could not see the person's face; but she found that all she need do to find out who the friend was, coming through the doorway, was to look in a mirror over the fireplace on the opposite wall. There she could see quite clearly the face and head of her friend, but she could not see herself in the mirror at all. When she got up from her seat and walked to meet her friend, she looked in the mirror, and so did her friend. They found they could see each other in the mirror as they advanced, but their own faces were not seen until they were opposite the mirror. They are puzzled about this. Can you help them with the reason?

THE SHELL THAT SEEMS SO NEAR

3. In the summer holidays, when we were bathing one sunny day, and there was hardly a ripple on the water, we could see the sand clearly at the bottom. Now, a funny thing happened. As we came down the steps of the boat-house to get into the water, the lower steps under water seemed quite near, and we thought the water must be very shallow; and yet we went down and down until the water reached up to our waists. There was a shell lying in the sand a little way out, which looked easy to pick up, but was really too deep down for our arms to reach without dipping our faces down under water. We tried with the other arm, but it was no good. What was the matter? Had our eyes all made mistakes and deceived us?

THE COLORS ON THE CEILING

4. A little boy had been ill with measles, and went to stay with his grandmother. He had to lie still on a sofa at first, until he grew strong. One day he was looking at the ceiling and saw some beautiful colors there in a row —red, orange, yellow, green, blue, indigo, violet. How did they come there? They were lovely pure colors, far nicer than those in his paint-box, and reminded him of those in a rainbow. But he saw no rainbow out of the window. He rubbed his eyes. No, the colors were still there. Then he said their names over to himself until his grandmother came. She told him about a little boy who found out about those wonderful colors. What do you think she said had made them?

THE VOICE THAT CAME FROM A ROCK

5. High up on the Alps in Switzerland people want to send messages across to the mountain on the other side of the valley, or at the bottom of it. But it takes long to walk, so they have found a way of calling to each other. See! there is a mother standing at her cottage door, wanting to call to her son, who, she knows, is far below her down the mountain. With both hands to her mouth she sends forth the cry "Come home!" not straight down to him, but towards a rock below on the opposite side of the valley. Then she waits. After a few seconds she hears the answer "Coming," not from below her, but from the opposite rock. Why did she not call straight down to her son?

THE SCENT THAT CLIMBED OUT OF A BOTTLE

6. Someone gave a little girl a large bottle of eau-de-Cologne for a Christmas present. That scent is sometimes refreshing to anyone with a bad headache. The other day the little girl's mother had a headache, so she brought the scent for her, and dabbed some with a handkerchief on her mother's forehead. She left the corner of the handkerchief in the wide neck of the bottle on a side table and forgot all about the bottle. Next morning she went to seek it, but found that much of the eau-de-Cologne had disappeared. The handkerchief was wet, as though it had been soaked with scent. It was puzzling to know how the scent had got out of the bottle. Do you know why it could not help getting out?

ANSWERS TO THE GAME OF "WHAT IS IT?" ON PAGE 2523

THESE are the answers to the History Puzzles that are to be found on page 2523:

1. King John signing Magna Charta.
2. Landing of the Pilgrim Fathers with their wives and children from the Mayflower.
3. Queen Margaret, the wife of Edward IV., and her little son, saved by a robber.
4. Luther nailing his propositions to Wittenberg church door, and burning the Pope's bull of excommunication which was sent to him.
5. Sir Francis Drake warned of the approach of the Spanish Armada while at bowls.
6. The Emperor Napoleon imprisoned in the little island of Elba in the Mediterranean.

GAMES TO BE PLAYED IN THE NURSERY

BIG boys and girls will not want to come with us now, for we are going to the nursery to have fine fun and frolic with the very little people.

HUNT THE SLIPPER

ALL the players but one—"cobblers," as they are called—sit on the floor in a circle a few inches apart. Then the customer comes and says: "Please, I want this old slipper mended. I will call for it in ten minutes."

She hands one of the cobblers an old slipper, and turns away. When she has counted up to ten, she comes back, but is told the slipper is not ready.

"I must have it," says the customer.

"Then you must find it," all the cobblers reply.

At that the search begins. Each cobbler passes the slipper on to his or her neighbor, hiding it from sight as much as possible; but should the seeker spy it and call out the name of the cobbler who has got it, that cobbler must take her place, and bring it to be mended again. The slipper must not stop in one place, but must keep passing round the circle, either one way or the other.

THE GARDEN GATE

THE garden fence is made by all the players, except one, holding each other's hands, standing in a big ring. In the middle stands the single player, while the rest dance round her three times. Then they stand still while she sings:

"Open wide the garden gate, the garden gate, the garden gate,
Open wide the garden gate and let me through."

But the "fence," as the ring is called, only answers, as it dances round again:

"Get the key of the garden gate, the garden gate, the garden gate,
Get the key of the garden gate and let yourself through."

Then the poor prisoner cries:

"I've lost the key of the garden gate, so what am I to do?"

Still dancing, the others sing:

"Then you may stop, may stop all night within the gate,
Until you're strong enough, you know, to break a way through"

At this the prisoner runs between two of the boys and girls—the "palings" of the fence—and if, by pushing, she can make them unclasp hands, one of them takes her place in the middle, and the game begins again.

HUNT THE RING

THIS game is played by all the boys and girls standing up in a circle, with the seeker inside. The ring is slipped on a long piece of thin cord or twine, the ends of which are then tied together. Each one in the circle holds this cord with one hand and passes the ring along it with the other. The game is to pass the ring along while the seeker is looking another way. The ring may be hidden by holding the hand over it till there is a chance to pass it on. The ring must not stay in one place, and when it has been found the one who held it must take the place of the seeker.

HOLD FAST! LET GO!

YOU must listen to what is said in this game, and be careful to do exactly the opposite. Four players stand up, and each takes hold of one corner of a square sheet of paper or a handkerchief. A fifth player calls out: "Hold fast!" and anyone who does not let go will be out; while, if the order is "Let go!" those who *fail to hold fast* will be out. The orders must be given rapidly, one after the other, and someone is sure to make a mistake, but the last to do so, of course, is the winner.

PUSS IN THE CORNER

IN this game all the children pretend to be mice, except one, who is the puss. "Puss" stands in the middle of the room. Each mouse stands in a corner. While there Puss cannot touch them, but when they run across the room to change corners with one another she may capture any she can. No mouse should venture from a corner until she has made signs to another mouse with whom she would like to change houses, or she may find herself half-way across the room with no corner to run to. The mouse that is caught must take the place of Puss.

DUCK UNDER THE WATER

THERE should be a good many players for this game. Choose partners, and form two lines a little apart, each couple standing one behind another. The front or leading couple then form an arch by joining hands, and the last two of the line skip together down the alley of players, pass under the arch, and, stopping immediately on the other side, make a second arch. Then the next couple from the end do the same, and the next, and so on until a long tunnel is formed of lifted hands. The tunnel may be taken down by the first partners who began it lowering their arch and passing through. The next two follow, until the last arch falls, and the builders are ready for another game.

BLINDMAN'S BUFF

THOSE who want to make a great noise will have a chance now. One player is taken into the middle of the room, where a handkerchief is tied over his eyes. He is then turned round three times and told to catch whom he can. The other players run to and fro, passing as near to him as they dare, while the blindman rushes in all directions, clutching at those who seem nearest. When he succeeds in catching someone, he must guess who it is, and, if correct, the person

caught must be blindfolded in his place. If he cannot guess, he must leave go and try again.

WOLF

THE "wolf" is a player who creeps away to one side of the nursery, and hides behind chairs and tables or boxes. The "sheep" all huddle up at one end of the room, and the shepherd stands at the other. Presently he calls out to the sheep to "come home, for the night is falling."

"We are afraid of the wolf," answer the sheep.

"The wolf is away!" cries the shepherd.

Then the sheep all run across. Out jumps the wolf and catches whom he can. The game lasts till there are no sheep left to be caught.

BINGO

THE music for the song is given on page 2748.

The players join hands in a ring, with one of their number, who is called the "miller," in the centre. Then all, still holding hands, dance round and sing:

"The miller's dog leap'd over the stile,
His name was little Bingo:
B with an I, I with an N, N with a G, G with an O,
And his name was little Bingo."

Then as they stand still again the miller cries out "B" and points at one of the players in the ring, who must say "I," the next to her "N," and so on, until the little dog's name is spelt. The first player to say the wrong letter has to change places with the miller.

FEATHER AND FANS

A FLUFFY feather out of any cushion will do for this game, and if there are not enough fans to go round, stiff pieces of paper or thin card will do quite as well. Draw a line across the nursery floor, and let half the number of players be on one side, and half the number on the other. When all are ready, toss the feather into the air and keep it up with the fans. No players must leave their side of the line, but should do their best to stop the feather sailing across it. Those in whose country it falls at last lose the game. Of course, the feather, while in flight, must not be touched.

A GOOSE MARCH

ALL the players but one (who is the officer) form in a line, one behind the other, but a little way apart. When ready, the officer cries: "March!" Away go the soldiers at a rapid step, till suddenly the officer calls out: "Halt!" Anyone who bumps against his companion in front, or has both feet on the ground, is sent to the back of the line with a bad mark. The order to "March!" or "Halt!" is given as many times as there are "soldiers," and in the end the bad marks are counted, the one with the smallest number being the winner.

BRIDGE-BOARD

A BRIDGE-BOARD is a long, thick piece of wood with a number of arches cut in it. If we have not one, we can build a very good board from a box of bricks, or even by standing our smaller books in a row, and placing others across the tops. Each arch or opening of the bridge should be marked with a separate number, and one of the players, called the "keeper," should stand by it at one end of the room, while the rest go to the other end with marbles. Turns are then taken to roll the marbles through the bridge, the one who sends them under the arches with the highest number winning the game. When we build our bridge we can make the arches whatever size we like. They should be large if we choose to roll the marble from a distance, and small if we are going to stand near.

A HOUSE PAPER-CHASE

FOR this game we shall want a large number of pieces of square paper about the size of a playing-card. On each slip a figure should be marked plainly—thus, 1, 2, 3, and so on, up to 20 or 30. These slips are given to the boy who is the "hare," with permission to drop them one by one, in the order of the figures, anywhere he likes in the house, but always where it will not be very difficult to see them. After waiting a minute or two, the hounds start in pursuit, but must follow him only by finding the scraps of paper in their proper order. The hare does all he can to avoid being seen until he is safe back home at the starting-point, but even if seen he cannot be caught unless the hounds can produce all the slips of paper that he has scattered. If they make a prisoner of him, and he can show that there are numbers missing between those he still has and those in the hands of his captors, he must be set free again. If there are only one or two thus missing the chase becomes exciting, because he must not return home till all his slips are parted with.

TIT TAT TOE

DRAW a large circle on a slate with a very small one in its centre, then from one to the other draw lines like the spokes of a wheel, and put a number in every space between the spokes from 1 upwards. The more spokes and spaces the better. In the small inner circle 100 is written. The first player then begins by holding a slate pencil upright with its point in the space marked 1. Closing her eyes, she shifts the pencil round the wheel step by step, repeating these words:

"Tit, tat, toe, my first go,
Three jolly butcher boys all in a row.
Stick one up, stick one down
Stick one in the old man's crown."

With the last word she opens her eyes, and writes down the number of the space in which the pencil is resting. The next player then takes the pencil and begins "tit, tat, toeing," and when all have had a turn the scores are counted up, the one who has the highest number winning. Any player who puts the pencil into the inner circle scores 100, and wins at once, while those who let it rest on a line or spoke must pass it on to the next without counting anything.

SCHOOLMISTRESS

THE mistress stands in front of the class and, beginning with the scholar at the top of the form, she asks questions as quickly as she can think of them. She begins with the letter A, and forms her questions so that the answers begin with this letter. For example: "The name of an English queen beginning with A." If the answer is not given before she can count up to ten, she goes to the next scholar, and the next, until one is reached who replies. This scholar goes to the top of the class, and another question is asked on the letter B, and so on through the alphabet. It is *quickness* more than anything else that makes the fun in this game.

THROWING LIGHT

TWO players secretly choose between them a word that has two meanings, such as "Ball"—a thing to play with, and "Ball"—a dance. They then begin talking to one another aloud, referring to the word without using it. One will say: "I played with it in the garden this morning." "Yes," says the other, "and a friend of mine went to one last night."

Those listeners who think they have guessed what the word is may join in the conversation, but must pay a forfeit if mistaken.

TELEGRAMS

ONE of the players calls out that a telegram of ten words has to be sent off describing, let us say, the Boat Race, and the words must begin with certain letters. He mentions ten letters of the alphabet which he has chosen, and each player puts them down on a slip of paper. Five minutes are given for the writing of the telegrams, and when the time is up they are all read out aloud. Clever players sometimes make very funny telegrams, and a great deal of fun can be got out of the game. A prize can be given for the best telegram.

THE GENTEEL LADY

THOSE who take part in this game will want very good memories. It is begun by the second player from the left-hand end saying to her neighbor on the right: "Good-morning, genteel lady, always genteel. I, a genteel lady, always genteel, come from that genteel lady, always genteel (pointing to the girl on her left), to tell you that she owns an eagle with a golden beak."

The neighbor receives this information with a bow and repeats it to the girl on *her* right, adding at the end the words "and silver claws." This third player then bows and passes it on, adding to the sentence a remark about the eagle's feathers. Each player adds something of her own, and the first girl who fails to repeat, word for word, the message she receives has a paper spill, called a horn, stuck in her hair. The player sitting next then turns to her right-hand neighbor and takes up the tale in these words: "Good-morning, genteel lady, always genteel. I, a genteel lady, always genteel, come from this *one-horned* lady, always one-horned, to tell you," etc. Every mistake means a fresh horn, and the game often ends by all "genteel ladies" becoming "one-horned," or "two-horned," or even "four-horned," because with every repetition the words get more difficult to remember.

POST GENERAL

ALL the players sit round the room in a large circle, and one, who is blindfold, stands in the middle. Each player takes the name of a town, and the leading player makes a list of these, from which he calls out now and then, thus: "The Express is going from Boston to New York," choosing towns on opposite sides of the circle. Boston and New York jump up and slip across to each other's seat, the blindman doing his best to catch one of them as they pass. When several towns have changed places, and the blindman has failed to make a prisoner, the leader cries out "All change," when all must jump up and cross over to opposite sides. In the hurry and confusion the blindman is sure to catch someone, who takes his place while he becomes one of the towns.

WINKS

A CIRCLE is formed of chairs, one only of which is unoccupied. Behind each chair, including the vacant one, stands a player whose duty it is to prevent the person sitting in front from leaving his chair, though no effort must be made to check him until he shows some intention of escaping. The guardian of the vacant seat looks round the ring and winks to someone to come and occupy it. The player thus called must be very alert, or the one behind the chair will clutch him before he can get away. One touch is enough. If successful, the chair left becomes the vacant one, and the player behind it must lose no time in trying to get another tenant by a wink or a nod at someone else. The faster the changes take place the greater the fun, but the guardians behind the chairs must, of course, be as quick as they can to avoid losing their charges.

OBJECT GAME

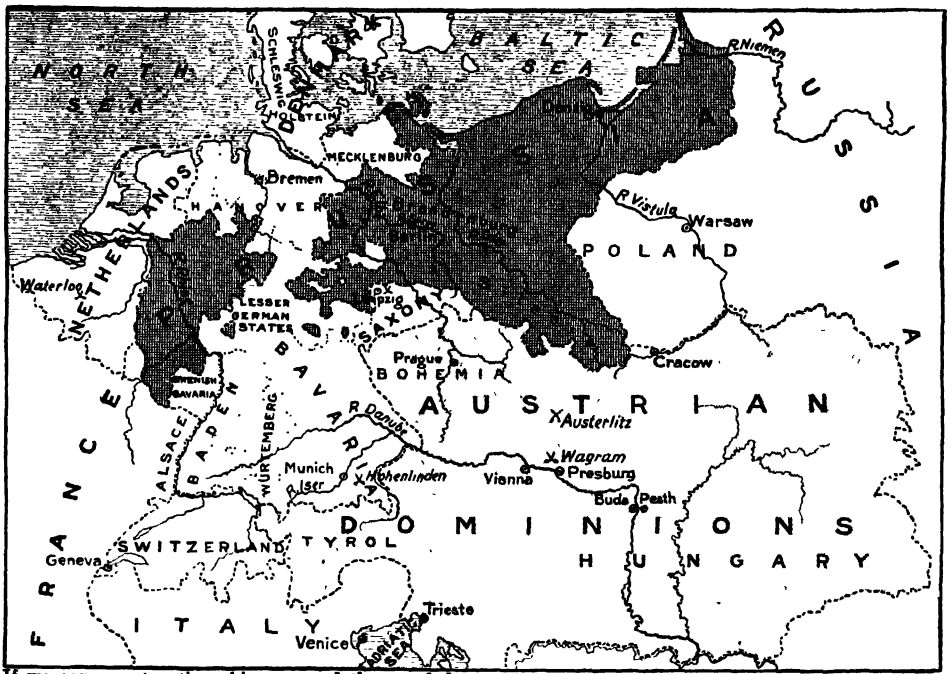
THIS is good practice for the memory and the power of observation. Each member of the party has a piece of paper and a pencil. When all are ready, someone enters the room carrying a tray with about twenty small articles on it. The tray is placed in full view of everybody and left there for one minute, during which time no one must touch pencil or paper, but must simply look at the contents of the tray. At a given word it is carried away, and the players must write down the names of as many of the articles as they can remember having seen. Only a certain time is allowed for this, and those who remember the greatest number of articles win the game. The objects chosen should be of the simplest kind—a black pin, a tiny piece of coal, some birds' seed, a piece of fluff, a hair, and so on.

YOU MUSTN'T LAUGH!

ALL sit in a row round the fire and look solemn. Then the first player says: "Haw-haw!" which is repeated all down the line, one after another. Those who can not do this without laughing afterwards are declared out, and the game begins again.

CONTINUED ON 2719.

PRUSSIA AND THE GERMAN EMPIRE



If we compare together this map and the one below we can see how much the power and influence of Prussia have grown in Europe since the fall of Napoleon Bonaparte. At the Congress of Vienna, in 1815, which settled the map of Europe for many years, Austria was the important power among the German-speaking nations; and, although Prussia was given nearly all the territory she had lost in Napoleon's wars, and more besides, her influence was not great. From this time there was great jealousy between the two.



With the coming of Bismarck, Prussia's power and influence grew, and reached out far beyond her own territory. This map shows Central Europe at the close of the Franco-Prussian War, in 1871, and we see in the dark shaded part how Prussia's influence had extended over other independent German states except Austria. All these countries are not part of Prussia, but, as members of the new German Empire, they all acknowledge the power and follow the lead of Prussia. Austria has ceased to influence other German states.



Representatives of the nations sitting at Vienna to restore order to Europe after Napoleon's fall.

THE MAKING OF GERMANY

CONTINUED FROM 2561

"WE must utterly break up Germany," were Napoleon's words and aim all through the years of bewildering, ever-changing conditions in Central Europe, when peace never once came to stay. At the most there were occasional stoppages in the war, while he was trying to disunite the German-speaking peoples. These were strong, while bound together, like the bundle of sticks in the fable, but easily destroyed when they fell apart. Unhappily, there were many jealousies and divisions among the states from one cause and another, and after the battle of Austerlitz several of the states joined together in a union "protected" by the French, in league against Austria and Prussia. Austria lost her fairest provinces after Austerlitz; Prussia, half her territory after Jena. When the noble-hearted and beautiful Queen Louise of Prussia begged Napoleon to have some mercy on her unhappy country, the insulting answer sent to her was—a map of Silesia, that rich province won from Maria Theresa by Frederick the Great, encircled by a golden chain and a pendant heart.

What a terrible set-back it was for the young, rising nation to have its army wiped out, French soldiers occupying the country, Napoleon ruling from Berlin, whence he sent out his Berlin Decrees about the trade with England. None could gainsay this conqueror, who could race about all over Europe—before there were any trains!—without sleep or rest; who could fight five battles on five successive days, and overcome every difficulty, even the snowy Alps. When Napoleon was at the very height of his success, between 1807 and 1809, it could be said that all Europe was practically under the power of two emperors. They were "The Man from Corsica" and the Emperor of Russia.

We have seen on page 2288 how the tide turned in the bitter Russian campaign. Central Europe was not slow in seizing the chance, and the whole German people rose against the hated yoke, eager to wipe away the dishonor of its defeats and subjection.

Prussia was particularly eager to drive out the French garrisons, and people hastily gave money or labor, or volunteered to fight. Nothing was too great or too small to do which might help to recover what had been lost.

The famous general, Blücher—he

who later reinforced Wellington at Waterloo—earned in one of the first battles at this time the name of Marshal "Forwards," from the soldiers who followed the impetuous leader to his thunderous cry of "Vorwärts!" He but expressed the spirit of the time. At the "Battle of the Nations," fought near Leipzig through four long, terrible days, Napoleon was beaten at last, and Germany freed from the French.

THE BREAK-UP OF NAPOLEON'S EMPIRE, & TEN YEARS OF DISORDER IN EUROPE

The empire of the "successor of Charlemagne," as Napoleon loved to call himself, fell apart even more quickly than it had been formed. It was not an easy task to bring back order in Europe, especially when many of those concerned at the Congress of Vienna proved to be jealous and greedy. But it was accomplished in some fashion at last, in spite of the thrilling interruption of Napoleon's escape from Elba, and the brilliant Hundred Days in which his genius made a last effort before the final and crushing defeat at Waterloo.

Pitt was right in that sad remark he made about the map of Europe, after Austerlitz, just before he died. It lay unrolled again before the Congress of Vienna which met in 1814. Let us study it, too, and get clearly in our minds the names of the chief states of the German-speaking people, and where they lie in that great central heart of Europe, with its mountainous masses to the south, its great plain crossed by many rivers to the north, its grand waterways of the Rhine and the Danube flowing north and east from its south-western corner. It is their natural features which have remained the same, unchanged through the centuries, in every map that has been drawn to show the constant changes that have taken place in the sharing-out of the land by the movements of men.

MOUNTAIN PEOPLE WHO LIVED QUIETLY AMID GREAT CHANGES

We have seen how these changes arose, by conquest, by the marriage of heiresses, by the division of states among different members of a family.

Perhaps the most stable of the provinces has been Bohemia, so safely sheltered by its semicircle of beautiful mountains, the Giant and Ore Mountains, the home of endless stories of gnomes and dwarfs. The Bohemians belong to a different family of nations from the old Teutons, or Deutschen, called the "Slavs," but they have counted as dwellers in a German state for nearly a thousand years. Their history touches that of England on the field of Cressy, when their blind old king was killed. Bohemia was the country of John Huss, a reformer who followed the teaching of John Wyclif. On its borders we can find Austerlitz. Its capital, Prague, is on a branch of the Elbe, one of the great German rivers flowing northwards.

Another state that has existed with very little change in its territory through history is Hungary, and it is also not a German nation. The Hungarians to this day keep up their own language and customs. Their ancestors, the Magyars, settled about the Danube where it takes its sharp bend southwards, near the modern capital, Buda-Pesth. The old capital is Presburg, to which, as we saw on page 2558, Maria Theresa fled for help when sore pressed by her enemies.

VIENNA, THE CAPITAL OF AUSTRIA, BAVARIA, AND SAXONY

Both Bohemia and Hungary long ago were joined with Austria, the state on the east border of the empire, which shifted its boundaries as the years went on, acquiring land or losing it, not only on its "home" edges, but, as we have seen, across land and sea, in the Netherlands, and in Italy. After the Congress of Vienna, its ruler, the Emperor of Austria, as he had styled himself some years before, when he laid down the title of Holy Roman Emperor, kept the beautiful eastern part of the Alps and lands on the Mediterranean waters, besides Bohemia and the sister state of Hungary. The great capital of this Austrian Empire is Vienna, on the Danube, which we have seen besieged by the Turks in the time of Louis XIV., and taken by Napoleon.

The kingdom of Bavaria is the neighbor of Bohemia and Austria, and its history has been much interwoven with theirs. So much has been taken from one end, and added at the other, that there is little of the original ancient duchy existing under the old name. Its fine capital, Munich, is on a tributary of the Danube, the "Iser rolling

THE SURRENDER OF AN EMPEROR



The Franco-German War was a series of brilliant triumphs for Germany and a succession of blunders on the part of France. The French Emperor, Napoleon III., and his army marched into a valley at Sedan, where, as a French writer, Victor Hugo, has said, they were "without order, without discipline, a mere crowd of men waiting to be seized by an immensely powerful hand." The Germans surrounded them and compelled them to surrender. Here we see the beaten French Emperor meeting Bismarck, Germany's "Iron Chancellor."

rapidly," so vividly described in Campbell's poem, "Hohenlinden," which is given on page 1059, where a great battle was fought by the French and Austrians in the early days of Napoleon's successes.

As for Saxony, north of Bavaria and Bohemia, so complete has been the shifting of its boundaries that the old land of the Saxons, from which the early conquerors of Britain came, has nothing in common with the Saxony of later times, except the name.

A part of the district where Saxons jostled Angles is now Hanover, lying about the root of the Danish peninsula, which separates the North and Baltic Seas. This district is particularly interesting on account of the free towns, such as Hamburg, Bremen, and Lübeck, which rose up in it, doing so much for trade and liberty in old days, and also because, for over a hundred years, the ruler, or "elector," of Hanover was also king of England. Dresden is the capital of Saxony, and is on the River Elbe.

THE BEGINNINGS OF THE GREAT KINGDOM OF PRUSSIA

To find the beginnings of Prussia, now a great kingdom stretching from the borders of Russia, along the Baltic Sea, and across to the Rhine, we must look for the old province of Brandenburg, between Bohemia and the Baltic. Gradually, during the last 200 years, East Prussia, West Prussia, and Silesia were joined to it. At the Congress of Vienna, Prussia gained half of Saxony, and large districts on the Rhine.

It is strange that the name of this leading German state is that of the conquered old land of the alien Prussians, just as the English to-day call themselves and their land British and Britain. Berlin, the capital, stands on the River Spree, which connects with the Elbe, at the meeting of the ways in the great plain. It first owed its growth to the rulers who laid the foundations of the greatness of Prussia.

To the east of Bohemia and Brandenburg there lay in the past, about the time when Columbus was sailing the clear Caribbean Sea, the large and flourishing kingdom of Poland, a "Slav" country, like the others on the eastern borders of the empire. To-day the name of Poland is wiped off the map. Its frontier was ever changing, and at times, when the country was exceptionally weak, or under bad rulers, its stronger neighbors swooped down upon it, and shared its lands amongst them. Frederick the Great of Prussia, Maria Theresa of Austria, and the Emperor of Russia, all helped in dividing Poland.

THE EMPERORS AND KINGS TRY TO BRING ORDER TO EUROPE

We have seen how Francis II. of Austria laid down the sceptre of Charlemagne and the crown of the thousand-year-old Roman Empire. This empire had kept together in a loose sort of way—more and more loose towards the end—these old states of Germany, and many more; and, after the Congress of Vienna, we see a confederation of German states, consisting of many smaller states, and two very large and powerful ones—the empire of Austria and the kingdom of Prussia. These were very jealous of each other's powers, and it was soon felt that the arrangement could not be a lasting one, especially as important changes in every direction, but chiefly in men's minds and thoughts, were seen to be hurrying on all over Europe.

It was the emperors, kings, and princes who settled matters at Vienna, and their idea was to restore things, as far as they could, to what they were before Napoleon's wars upset everything. But the people could no longer be forced to pay taxes they had had no voice in settling, to obey laws they had had no share in making, or to fight in wars arising out of their princes' quarrels.

THE GREAT LONGING OF THE PEOPLE FOR UNITY

The people wanted legislatures, with real representation of all classes; they wanted open courts of law and trial by juries; freedom of the Press, freedom in speech, and, above all, in religion. Slowly, through the years that followed the settlement of Europe at Vienna, the friends of freedom gained what they wanted. The revolutions in France during this time, of which we read on page 2289, especially the one in 1848, had a great influence in Germany; many of the rulers gave way on contested points for fear of being sent away, like Louis Philippe.

Another strong desire, besides the longing for liberty, was working in men's minds through all these years. It was

a growing wish for unity, the joining together of German-speaking states, so that they might show one undivided front to the rest of the world, especially in times of war and trouble. The very efforts that Napoleon had made to crush what small measure of unity the old Germany possessed had been the means of giving it fresh life, for what draws any family together closer than a common sorrow, or working together with a common object in view?

THE BLESSINGS OF PEACE, AND THE UNION OF THE GERMAN PEOPLES

But not only at the Battle of the Nations was there the sympathy of common effort, but the very hardness of the struggle for freedom in each separate state brought men, hitherto divided, nearer together. Then a great change in the customs, or taxes, hitherto set on all goods as they passed the frontiers of each state, was of immense help in opening out intercourse and good-fellowship as well as trade, for the barriers were done away with, and with them the expense of keeping up guarded frontiers. Most states joined Prussia in this customs union, but not Austria.

Then there were, besides all this, the blessings that came with peace. People were no longer afraid to build factories as hitherto, lest they should be burned or destroyed by an enemy's army, and trade grew as inventions and machinery of all kinds developed and were worked by steam. When the shining steel rails, laid down in state after state unceasingly, drew distant and out-of-the-way places closer together by making travel easy and quick, people could not only trade more, but could learn to know each other better, and so become less ignorant and narrow-minded.

BISMARCK, THE BOY WHO WAS BORN IN THE YEAR OF WATERLOO

In all the growth that was going on in these middle years of the nineteenth century, it was Prussia—the youngest of the kingdoms—that grew the fastest, and more and more took the lead in the German family of states.

Both times and men were ripening for the coming change. In the very year of the battle of Waterloo there was born a boy who grew up very clever, very determined, very far-seeing, through the years of change and growth in Germany. He made his way in 1847 into the legislature of the day, and learned much about other countries by being ambassador at Petrograd and Paris. Then his sovereign, William I., had need of him, and he became the king's chief Minister. This man was Bismarck, who saw plainly from the first how Prussia could rise to greatness, and set his face, like a flint, to make it great.

When the army had been reformed and strengthened, William I. and Bismarck were ready for the first step. Prussia went to war with Denmark about the two provinces of Holstein and Schleswig, between the Baltic and North Seas, which were claimed by both Denmark and Prussia. Austria joined Prussia in this war, and soon the two giants had their way over the smaller Power. Then, when Bismarck had settled the dispute that arose between the giants as to what should be done with the conquered provinces by taking possession of them for Prussia, he was ready for the second step.

THE GREAT MARCH THROUGH THE AVENUE OF LIMES IN BERLIN

This was war with Austria; the long-smoldering jealousy of the two rivals must now be settled by force of arms. The great General Moltke came to the front, and in seven weeks the war was finished by the final victory at Sadowa, in Bohemia, and the appearance near Vienna of the Prussians.

There is, in the city of Berlin, a wide street nearly a mile long, with an avenue of lime and chestnut trees. It is called "Unter den Linden," meaning "under the limes." At one end of the avenue is a magnificent gate, looking towards the old province of Brandenburg; at the other is the fine palace of William I.

Back under that Brandenburg Gate passed the victorious troops, the king welcoming them and leading them up the Unter den Linden, with Bismarck and Moltke, amid the girls scattering flowers, and the waving banners, and the music, and the enthusiastic crowds cheering and shouting "Hoch! Hoch!" to those who "in seven weeks had sped through Frederick's Seven Years," and had thus, almost at a blow, settled the leadership of the Prussian nation.

The peace that followed this war brought about great changes. New lands were added to Prussia; Austria lost some of hers. The old German

Confederation was done away with, and a new one formed of Prussia and the states north of the River Main, which runs into the Rhine at Mainz. A legislature, called the Reichstag, was formed of members from all the states that had joined the union, and in this Reichstag were to be discussed the questions affecting the states as a whole. Each state still kept control of its own affairs.

THE THIRD STEP IN THE SHAPING OF THE GERMAN EMPIRE

But Austria, so long the leader and head of the old Roman Empire, was shut out. Then, when the sharp rent between the two rival Powers was complete, the King of Prussia on one side of the mountains of Bohemia, the Emperor of Austria on the other, Bismarck was ready and waiting to take the third step in his plan for making Prussia great.

This was the chance of war with France. It came even sooner than he had dared to hope. We have already seen how Napoleon III. was disturbed at Germany's growing power, and how he wished to make his throne safe by dazzling the nation with military glory; especially did he wish to please his people by securing all the land right up to the Rhine. An occasion for disagreement with Prussia soon rose. This happened to be that a Prussian prince was named as a king for Spain.

Upon this there followed one of the most surprizingly rapid and dramatic wars ever fought in Europe, the details of which many of our fathers and mothers read day by day in the papers, for it is only about half a century ago. Visitors staying in Germany at the time recall the story of the intense excitement just before the war broke out.

HOW THE FRENCH ARMY WAS DRIVEN INTO A TRAP AT SEDAN

Students in the university towns shouted themselves hoarse all night long with patriotic songs and loud hurrahs and "hochs!" Trains were crammed night and day with soldiers on their way to the front; and there was a constant stream of stores, food, and ambulances being made ready for despatch. Enthusiasm rose to a height when the South German States, who had not joined the new Confederation, threw in their lot with the Northern States led by the King of Prussia. Only Austria was shut out. France was greatly excited, too, and the soldiers set out for the Rhine, shouting valiantly: "To Berlin." But they were not ready for war. In the course of a fortnight the whole frontier was lined by German troops ready for action. And then—the pity of it!—in the beautiful, peaceful woods and passes of the Vosges Mountains, and the plains about the Rhine, the awful scenes of war brought misery to thousands of innocent people.

In the course of a month a large part of the French army was caught in a trap, and soon at Sedan Napoleon wrote to the King of Prussia: "As I have not died at the head of my troops, I hand over my sword to your Majesty." The whole French army surrendered: thousands of men, with officers, generals, marshals, cannon, and horses. An army of 135,000 men ceased to be.

Great was the rejoicing and excitement in the Unter den Linden, and before the king's palace when the telegrams reached Queen Augusta. She had to come to the balcony again and again to respond to the people's cheering.

THE BITTER NEWS THAT REACHED PARIS, AND THE FALL OF THE EMPEROR

When the bitter news reached Paris, Napoleon, a prisoner, was deposed, and a Republic proclaimed, and the new Government insisted on going on with the war. Within a fortnight of Sedan, the Germans were besieging Paris.

A second French army, even larger than the one defeated at Sedan, was now surrounded at Metz; but, in spite of this second disaster, the French gallantly tried to drive the Germans from Paris. Bismarck was now ready for his fourth and last step.

During this time the states of Germany, drawn together in fighting a common foe—their deadliest enemy in the past—took counsel together and decided that, the arms of Prussia being triumphant beyond all question, the moment had now arrived to put a seal on the unity of feeling that was growing stronger and stronger, by asking William I., the king of the victorious and leading state, to become the German Emperor, the head of the confederation of kings and princes.

How strange it seems that the brilliant scene, when William I. was hailed with wild delight as German Kaiser,

PROCLAMATION OF WILLIAM I, AS GERMAN EMPEROR, AT VERSAILLES



This is a picture of the proclamation of William I, German Emperor, during the Franco-Prussian War. In the first flush of victory, after the defeat of the French armies, it was proposed that all the German states, except Austria, should federate as an empire, of which the Prussian king should be emperor. The proposal was adopted, and the new emperor was enthusiastically proclaimed in the great hall at Versailles, on January 18, 1871. The man at the emperor's right—a little behind him—is Crown Prince Frederick, who afterwards reigned as emperor for a few months. The man below the dais, in a white uniform, is Prince Otto von Bismarck, the first chancellor of the new empire, who had been the directing force behind William while king of Prussia. He made the empire possible, and continued to serve the emperor faithfully.

should have taken place in the palace of Versailles, built by the greatest enemy of Germany, Louis XIV.

THE PRICE WHICH BISMARCK DEMANDED FROM FRANCE

The terms of peace which Bismarck forced the French to accept were very severe. The Treaty of Frankfort, which was signed May 10, 1871, said that France must give up all of Alsace, and much of Lorraine. She must pay the enormous sum of a billion dollars within three years, and must support a German army until the money was paid. As parts of the money were paid some of the soldiers were to be removed. The people rallied as one man to the support of the temporary government of France. No one had dreamed that there was so much money in the country. All, rich and poor, brought out their savings to lend to the government. The money was paid over to the Germans much sooner than any one had thought possible, and the German army marched out of France.

The German Empire was organized soon after the Emperor had been crowned. It is now composed of four kingdoms, six grand-duchies, five duchies, seven principalities, three city republics, and the crown-land of Alsace-Lorraine, which is not allowed to govern itself. Austria was shut out. Prussia alone has about three-fifths of the territory and the population, and since the King of Prussia is always German Emperor, that state has been able to rule the Empire in most things.

HOW THE GERMAN EMPIRE IS GOVERNED

The legislature of the Empire has two houses. The upper house, called the Bundesrat, is something like the United States Senate but has much more power. Except from the city republics the members are not elected but are appointed by the rulers of the states. They represent the kings, dukes or princes and not the people. The members from each state vote as they are instructed by their ruler. The Reichstag is something like the United States House of Representatives, but has much less power. The members are elected by the people, but more than half of them come from Prussia. While not half of the members of the Bundesrat come from Prussia nothing can be done without the consent of that state. In their own affairs each state makes its own laws, if they do not interfere with the laws of the Empire.

The Chancellor is the actual head of the state. He is appointed by the Emperor and represents him and not the legislature. This is quite different from the plan in England or France, as you have learned. Otto von Bismarck, who had done so much to make Prussia strong, was Chancellor of the Empire from the beginning until 1890. He made the army still stronger, so that the Empire could not be attacked safely, and made a treaty with Austria and Italy, that they should defend one another, if attacked. He worked to strengthen the Emperor and the Empire. He encouraged manufacturing, and soon the Empire began not only to make most of the goods it needed but to sell much outside. For some kinds of goods, as dyes, chemicals and certain kinds of glassware, the German manufacturers supplied nearly the whole world. At first Bismarck did not believe that colonies strengthen a state, but changed his mind and the Empire seized a large part of Africa. Some islands of the Pacific also came under German control.

THE THREE RULERS OF THE GERMAN EMPIRE

William I was already seventy-four years old when he became Emperor, but he lived until 1888, seventeen years longer. He had been a strong ruler of Prussia, but during his last years he left the management of the affairs of the Empire very much to Bismarck, whom he trusted entirely. His people loved to see him as he rode about the streets, or in the parks, and mourned when he died.

He was succeeded by his son Frederick, who had won golden opinions by his skill as a soldier, and his love for books, art, and music. He married the eldest child of Queen Victoria of England, and both took great interest in the education of women. Before his father died it was known that he had a serious throat trouble, and that an operation had been performed. It was not successful, and he came to the throne only to die. The sad event occurred June 15, 1888, after a reign of only ninety-nine days.

He was succeeded by his son William II, the present Emperor, then a young man of twenty-nine, who has been the ruler of the Empire ever since.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2761.

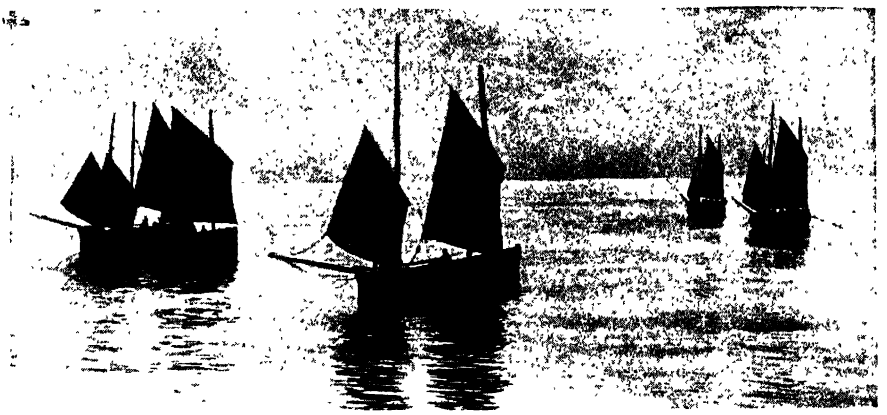
FISHES IN THEIR NATURAL COLORS



Some of these fishes have no English names, but these are the names by which they are known to all Natural History Students

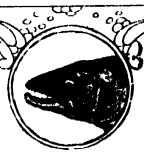
A Barred chætodon
B Scarlet holocentrum
C Banded chilodactyle
D Eyed blenny
E Triggerfish
F Cobbler fish
G Red finned tapestes
H Japanese dragonet
I Two spotted cheilinus
J Fire-fish
K Banded parrot-fish
L Electric eel
M Many banded rudder
N Marcent
O Scarce color chætodon
P Scarce color chætodon

Apart from this picture, fishes vary much in color, and some are quite bright and gaudy. They are not the same color all the [illegible] to that season of the year when they are looking out for mates.



SMALLER FISHES OF THE SEA

CONTINUED FROM 2484



NOWHERE do we find the struggle for existence more keen than in the sea. Nearly all the fish are fish-eaters. Big fish eat lesser fish, and the smaller ones eat others still less in size. Life is one long battle for food, and food of fishes is for the most part living animals. After all, the conditions in this respect are not so greatly different from those on land. The carnivorous animals cannot eat anything but flesh; the birds of prey must have flesh for their support; the insect-eating birds must kill lesser living things for *their* support.

In a single mouthful a big hungry fish can swallow enough tiny fish to populate a whole sea. Therefore, if the various species of fish are not to die out, their families ought to be very numerous. And we find that that is so. It is really necessary that their numbers should be cut down, or the waters would not hold them all. We shall come to some startling figures in the insect families, but those of the fishes almost take away our breath.

Think what would happen if all the eggs of all the fishes hatched and all the little fish grew up! The common herring lays about 25,000 eggs; the lumpfish about 155,000; the big halibut lays about 3,500,000 eggs. which, considering the enormous number, are large eggs; the codfish lays over 9,000,000, while the ling lays about 150,000,000. One healthy ling would lay more eggs than there are people in the whole of the great United States. Now, unless there were severe checks, these numbers would speedily fill the seas, so that, though it is hard for those that suffer, it is necessary for the others that the numbers of fish should be reduced.

The people who like caviare will not thank the fishes which make their dinners of the eggs or young of the sturgeon. Caviare, which is a form of Russian food sought after mainly because it is so costly, is made from the roe of the sturgeon. The flesh of the fish is not of much account where its roe is chiefly desired. In England, however, people long ago made up their minds that the sturgeon is a luxury, and Edward II. greedily decided that any sturgeon caught in English rivers should be his. It is always called the royal fish in England, and even to-day, were one caught in the Thames, it would legally belong to the Crown, though of course the king would not allow it to be claimed from the man who caught it.

In America sturgeons are well-known and eaten, but no caviare is made. They go up rivers to lay their eggs. The river Volga is famous for its sturgeons, and it is from the

fisheries there that most of the caviare comes. The air-bladder of the sturgeon is made into isinglass. A piece of this bladder, if put into a hundred times its quantity of water, will turn the latter to a jelly. In structure the sturgeon is notable for the bony shields with which it is armed. It has a long snout, with which it roots in the mud and sand for worms and other food. Its mouth is underneath, and is equipped with finger-like feelers, with which it picks out its food.

Isinglass or gelatin is made from the air-bladder of the cod also. But that is of minor importance in regard to this fish. The cod is of great value as a food supply, while it yields an important medicine-food—cod-liver oil.

FISH THAT HAVE PROVIDED FOOD FOR A COLONY FOR 300 YEARS

Codfish are to be found where the herring shoals are, and swarm in enormous numbers off Norwegian coasts, in the North Sea, and to a still larger extent off Newfoundland. Codfish first established the importance of Newfoundland, Great Britain's oldest colony. There, for more than three centuries, fishing has been the chief occupation of the people. Thousands upon thousands of men depend for their living upon the cod-fishing, and almost as many women and children help in the curing of the fish.

Not nearly all the cod caught could be at once eaten; the greater number of them are salted and sent to various parts of the world to serve as food long afterwards. The average cod is from 2 feet to 4 feet in length, but some of them weigh 100 pounds.

It is to the banks of Newfoundland that most of the American fishermen go each year to get the vast supply which is needed for the people of the United States. These banks are ridges in the ocean where the water is only a few hundred feet deep, and where the cod assemble in great numbers in winter, feeding largely on the clams which swarm on the bottom, on squids, and small fish. This is the season of cold and storm, but hundreds of hardy men go from Gloucester, Marblehead, Portland, and other towns in New England, and in the Canadian provinces, in swift little vessels, and set their trawls, often when gales and snow make the sea tempestuous, and the air freezing cold. These trawls are long lines anchored at each end, and held up by buoys, to which are fastened every few yards other lesser lines, with baited hooks, which hang far down in the water. The cod seize the bait on some or all of these hanging hooks, and get caught. A few hours later a couple of men in a little row-boat, called a dory, go out and haul up the trawl, take off the cod that have been captured, rebait the hooks, and return to their ship. But often a fog or a snowstorm comes up to hide them from the captain's sight, and many a dory and its men are never picked up at all. These fishing-vessels are splendid sea-boats, and it is from them that our swiftest yachts have been perfected. Yet many are lost, and no occupation requires more courage and endurance than that of these fishermen.

The common Atlantic cod is probably the most important of the sea fishes in respect to the United States; yet it is not the only one of this valuable family, for several of its relatives are caught for food, and eaten fresh or salted or dried. The big hake is one of these; another is the haddock. In Scotland the favorite breakfast fish is the whiting, a capital sort of codfish, which, unfortunately, does not live on the western side of the Atlantic. There are good codfish in the North Pacific, too.

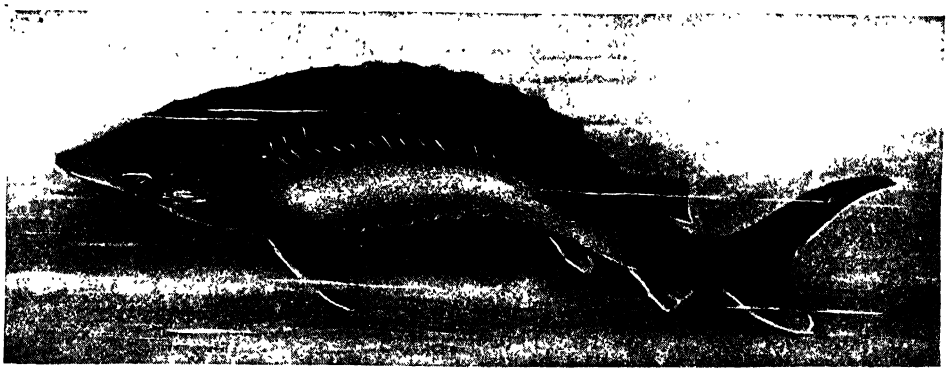
THE NET THAT CATCHES THE MACKEREL, ONE OF THE SWIFTEST FISH IN THE SEA

Our American fishermen catch mackerel and herring, too; but the most important, interesting fisheries for these fish are in Great Britain.

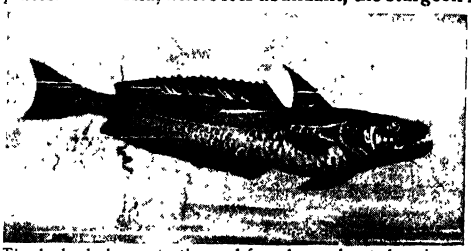
The mackerel is one of the fleetest swimmers in the sea. It is beautifully built for swimming, and has wonderful muscles, which give it both speed and strength. Countless moving swarms of mackerel are to be met. They lay their eggs on the surface of the water out at sea, but at certain times of the year they come into the shore.

The reason is that they follow the herrings, pilchards, and sprats, on which they feed. It is then that the fishermen net them. The nets are floated in the water, hanging straight down, like walls of thin cord. Owing to the color of the nets the mackerel cannot see them, but dash straight at them. Their heads enter the meshes, but the latter are too small for the thick part of the body to pass through, and the mackerel finds its

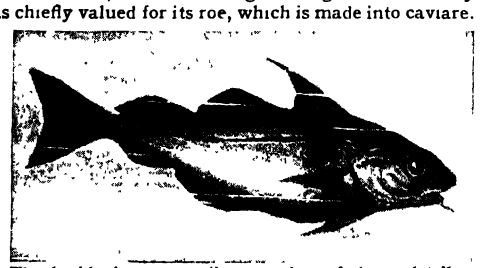
A ROYAL FISH IN GLISTENING ARMOR



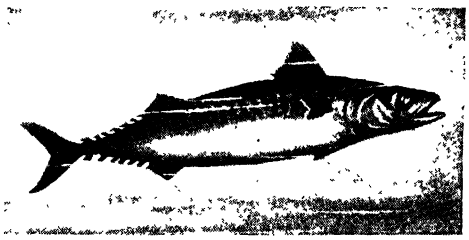
The sturgeon is called the royal fish in Great Britain, because long ago a king said that all sturgeons caught in England should belong to the Crown. It is a handsome fish, covered with glistening scales of horny plates. In Russia, where it is abundant, the sturgeon is chiefly valued for its roe, which is made into caviare.



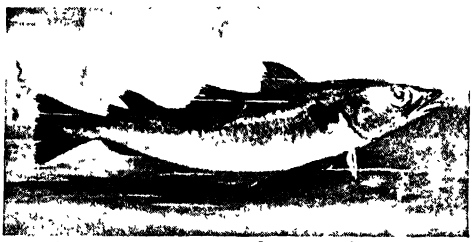
The hake belongs to the cod family, and eats herrings.



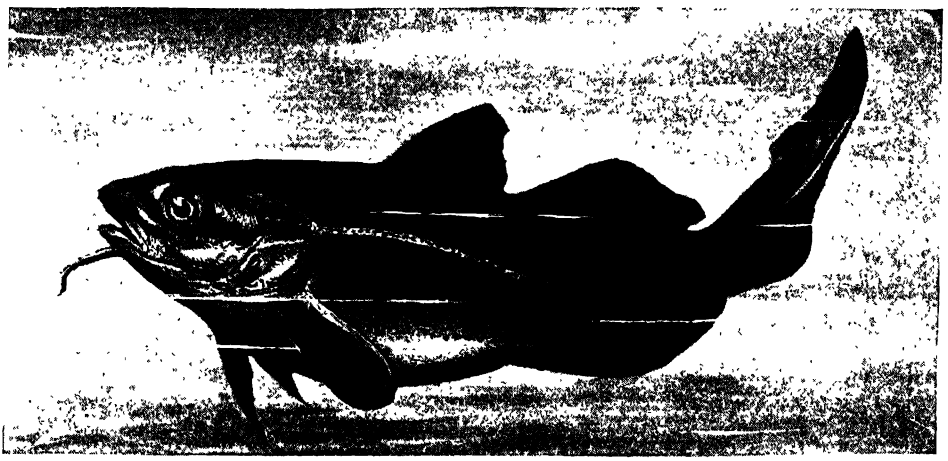
The haddock is a smaller member of the cod tribe



The mackerel is one of the strongest and swiftest of fish, perfectly shaped for speed and endurance.



The whiting is a member of the cod family. It is plentiful round Plymouth, on the English coast.



The cod is one of the most important fish of the northern seas. Newfoundland depended for a long time upon the cod-fishing for its prosperity. The fish was so important to the people that they used to salt the flesh and give this in payment for other things, making it serve the purpose of money.

gills entangled in the netting. A million of these splendid fish were caught during a single week by the fishing boats of Newlyn, near Penzance.

A FISHERMEN'S HARVEST OF FIFTY MILES OF FISHES

The fishermen, on getting out of harbor, found what they called a sea of mackerel, measuring fifty miles round. These sound very big figures, but we must remember that the harvests of English and Welsh fishermen amount in a year to 500,000 tons of fish in some years, and the value of the fish taken to more than 30 million dollars. Those figures do not include the millions of all sorts of shell-fish caught. Neither can they include all the fish brought into the smaller ports. Thus we may see that the fish round the coasts are very important to the food supply and wealth of the country.

The herring is among the fish which yield the fishermen the greatest harvests. Its very name means multitude, for it comes from a German word signifying an army—an army of fish. It is a beautiful fish, with which we are all familiar, so there is no need to describe its appearance. But its habits repay study. In spite of the vast numbers caught, the herrings were themselves a great mystery to us for ages. Men believed that the fish congregated in their millions of millions in the cold waters of the frozen north, to which men could not go; then, at certain times of the year, obeyed the call of Nature to come to warmer latitudes, as if to offer themselves as food for men. We know now that the herrings do not come from the north.

THE GREAT ARMIES OF HERRINGS THAT COME AND GO IN THE SEA

They have their constant home in the waters off our own coasts, in the North Sea, in the Baltic, and elsewhere. It was believed that the great armies coming down from the north broke up into smaller contingents, calling at various parts of our coast, from the extreme north of Labrador down to Virginia. That, however, is not the case. They come in from sea in straight lines to the spots off the coasts where they wish to lay their eggs. Every year numbers of Scottish girls go from point to point of the coast, staying a week or so here, and a week or so there, to cure the herrings which are caught at each place in turn. They say that they are following the herrings from north to south. They are not; they are meeting the herrings as they come in from the sea. There are acres and acres of spawning-beds on our coasts to which the herrings go year after year. The eggs are laid in myriads among deep rocks, where they cannot be trawled up and destroyed by the nets of the fishermen. It is a good thing that the eggs are so numerous, and laid far from the reach of men, for the herrings have many enemies; such fish as haddocks eat enormous numbers of the herrings' eggs. But one of the wonderful things in Nature is that, where fish eggs are greatly sought as food by other fishes, the fish which lays them provides very large numbers. Where the eggs are few, the fish guards them; where they are many, the fish leaves them to their fate.

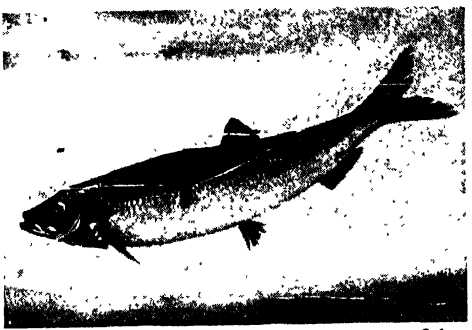
HOW THE HERRING HAS HELPED TO MAKE TOWNS RICH AND PROSPEROUS

The herring grows rapidly, but it does not attain full size until about two years old. When still quite small, it is caught and served up as whitebait. The flesh of the herring itself is excellent food, and someone has wisely said that if these fish cost a dollar each they would be prized as among the finest of fish.

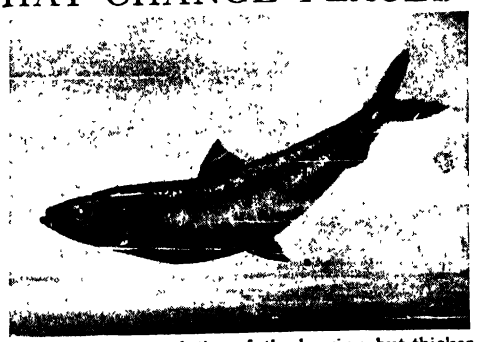
Though they can be traced in the sea with such accuracy that the sailing of the fishing fleets may be directed by telegraph, the herrings do not always go to the same grounds. In the Baltic Sea, in which they used to swarm, there are not nearly so many as there were, and those remaining are smaller than the rest of the family. The Baltic is becoming less and less salt, and therefore the fish desert it or, if they remain, do not attain to much size and strength.

Many changes in the herring's travels have been noted in the course of history. Towns grew prosperous upon the harvest of herrings—Amsterdam, in its early stages, was built up very largely upon money made by the fishers of the herrings—and towns have declined when the herrings have changed their quarters. For ages the herrings used to teem at certain times of the year off the south coast of Sweden. Then they suddenly deserted it, and not a herring was seen there for seventy years. A few years ago

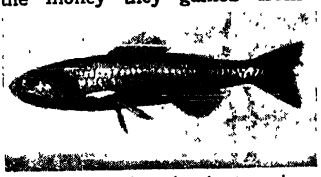
FISHES WITH EYES THAT CHANGE PLACES



Herrings are among the most numerous fishes of the sea. Cities have depended entirely on the money they gained from herring fishing.



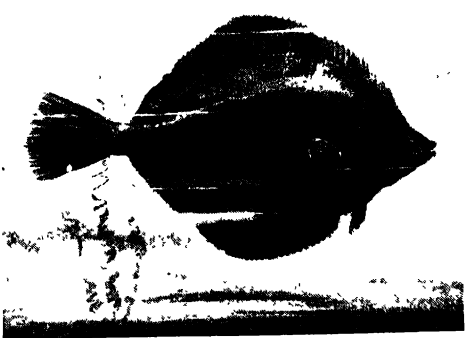
The pilchard is a relative of the herring, but thicker and shorter. As it grows up it loses its teeth. When young, pilchards are sold as sardines.

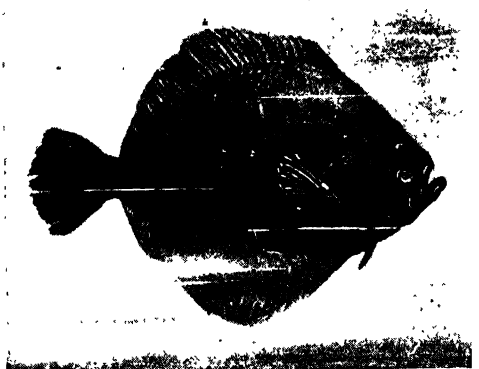




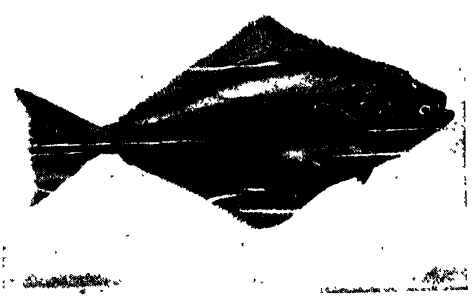


The sardine, the whitebait, and, on the right, the sprat, are all related. The sardine was first called the Sardinian fish, but nowadays young pilchards and little herrings and sprats are preserved in oil and called sardines. Whitebait are young herrings or young sprats. They are plentiful in the Thames, and in other days statesmen went to Greenwich for whitebait banquets as they now go to the Lord Mayor's feasts.





On the left the plaice, and on the right the turbot, represent the flat-fish family. They are formed like other fish when young, but as they grow older they undergo a strange alteration. The body is flattened, and the left eye travels round one side of the head, to be on top of the head like the right eye, so that the fish may see upwards with both eyes. Young flat fish live out at sea, old ones prefer shallow seas.





The halibut and the sole are two of the most important flat fishes. They have the same structure as the plaice and turbot. Their under side is really the left side, and the upper is the right side. When at rest they lie perfectly flat, with the left side underneath, and that side, receiving no light, has no color.

they returned, and the fishing industry has since then revived.

Sprats, shads, and sardines belong to the herring family. The sprat is so much like a small herring that only the trained eye of the expert would discover the differences which exist.

THE LITTLE MEMBERS OF THE HERRING FAMILY THAT HAVE MANY NAMES

They are treated as common food when sold as sprats, but when given the name of anchovy or whitebait, or served up in oil as sardines, sprats fetch a high price. The herrings come near land to lay their eggs; the sardines go out from the coast and lay theirs on the surface of the deep sea. So does the pilchard. This latter fish, off the English coast, reaches a length of 10 inches, and forms an important item of food, especially to those people in the Mediterranean countries, to whom it is sent salted in great barrels. Many fish that we call sardines, which come to us from France, are really young pilchards, which have been preserved in oil. Cornwall fishermen now can the young pilchard, and Kentish fishermen can the little sprat, and sell them as sardines—a name which meant, when first given, "the Sardinian fish."

Plaice, which is a famous European flounder, feed many other fish with *their* eggs. They lay their eggs out at sea. The tides carry the eggs towards the coast. As they travel, the eggs, if they escape other fish, develop, and the young fish hatch out as they reach the spot in which to make their homes.

THE WONDERFUL WAY IN WHICH THE FLAT FISHES BECOME FLAT

They now sink to the bottom of the sea, and undergo a most wonderful change. At first they are little ordinary-looking, thin fish, swimming in a vertical position, as other fish swim. At the end of the first year they are only from $2\frac{1}{2}$ to 4 inches in length. In the next year they grow a couple of inches; but in the third year their size doubles, and they now become a foot long.

At four years of age they are from 14 to 20 inches long. But, in the meantime, they have wholly changed their appearance. Instead of swimming vertically, they now swim flat; they have become broad and flat. The eyes, instead of being upon the two sides of the head, as in other fishes, have changed their relative positions, so that both eyes are now *on top* of the head. One eye has traveled round, so that the plaice can see upwards with both eyes.

This is one of the most striking evidences of the way in which changes come about in animal life. There is no doubt that the flat fish were, once upon a time, shaped like other fishes; but now when they grow up they have the left eye on top of the head, in a line with the right. This is not the only strange change. The upper part of the fish becomes colored like the sand or mud in which it makes its home, while underneath, where there is no light, it is white. Thus it can approach living prey without being detected. We know that if the flat fish were exposed to light on the under side they would become colored there too. An interested gentleman once tried the experiment.

He put some flounders, which, with the turbots and soles, belong to the same family as the plaice, into an aquarium. But the floor of the aquarium he made of a big mirror, so that the light which entered from above was reflected upward again by the mirror at the bottom. The experiment lasted some months, and at the end of that time some of the flounders had become colored underneath as they were on the back.

FISHES THAT LAY MILLIONS OF EGGS AND FISHES THAT SWIM HUNDREDS OF MILES

The sole is the most prized of the flat fish; the turbot comes next in cost; brill is another favorite; so is the halibut. This fish, which is caught in the North Atlantic for the American markets, has been known to grow to a length of 20 feet, and to weigh 500 pounds. The halibut of even moderate size lays about 1,300,000 eggs, though the biggest lay three times that number; the brill lays about 325,000, but the turbot lays 14,000,000. The flat fish swim by a gentle undulating motion of the body. A plaice was marked and turned loose in the sea. Three months afterwards the same plaice was caught after it had swum to a spot 173 miles away. Other marked plaice have swum at the rate of a mile an hour.

The size of the halibut reminds us that among the fishes which we consider the smaller ones of the ocean there are some really big ones. There is another big fellow in the tarpon, the giant of the herring family, which measures 6 or 7

feet, and weighs from 100 to 200 pounds. When caught on a hook it makes prodigious leaps in the air clear of the water. But it cannot, in this respect, match the flying-fish. This is a beautiful creature of the southern seas, about a foot in length, armed with a greatly extended tail and huge fins, which serve it almost as wings.

A FISH THAT USES ITS FINS FOR WINGS AND FLIES OUT OF THE SEA

These fins are compressed in the water. When the fish, either with a view of escaping from an enemy, or a desire to fly, determines to leave the water, the fins spread out like parachutes, and the fish at the same time inflates its air-bladder and air-sacs in its gills, and away into the air the flying-fish goes, higher than the masts of a ship. Some people say that this cannot be called flying, but Mr. Bullen, who has so often watched them, declares that the fish truly flies. The wings do not flutter like those of a bird, but vibrate like those of an insect. Just as the fish is about to enter the water the gaping jaws of a dolphin may await it, but the fish sees its danger, rises again into the air and flies away, just as it did before. These fish fly 1,000 yards, says Mr. Bullen, and they only cease flying when their fins become dry and stiff.

The flying-fish is much prized for food at sea by sailors; but the fish has other enemies in the air and water. There are the seagulls above, there are the dolphins and tunnies below. The tunny is another of the big smaller fish. It may be anything between 6 and 10 feet, and its weight up to half a ton. It swims with precision to the spot which it knows the flying-fish will touch on returning to the water, and, if the fins be dry, down the tunny's throat goes the poor flying-fish.

A FISH THAT RIDES THROUGH THE OCEAN ON THE BACK OF A SHARK

The tunnies have some strange relatives called sucking-fishes. These latter have on their backs, extending back from the head, a wonderful sucking apparatus. Boys who have made leather suckers know how these work, and how strong a tug is necessary to pull up even a small one. Well, the sucking-fish's plates are still stronger, and once the fish has attached itself to an object it cannot be pulled off; it must be drawn sideways. Sharks are the fish to which sucking-fishes generally attach themselves, though sometimes they mistake a ship and fasten on to that, and go careering over the ocean, getting plenty of food on the way. Sometimes, too, they will cling to a turtle. Natives of Zanzibar and other places take advantage of this habit of the sucking-fish. They catch the fish, and, when they see a turtle in deep water, let down the sucking-fish on a line on to the turtle's back. The fish instantly grips the turtle and both are pulled up together, to the turtle's great surprise and indignation.

But this is not the only fish which bears the shark company. There is another, the pilot-fish, a famous little fellow. In olden times people believed that the pilot-fish used to guide and protect ships. He would swim before the ship when all was well, but would disappear, they said, if rocks or land were near, so as to warn the sailors of the danger of their running aground. It is a fact that the pilot-fish swims with ships and sharks, but it is not with any intent to guide or protect.

THE FISH THAT PILOTS THE SHARK TO FOOD AND SOMETIMES TO DEATH

When swimming with a shark, the pilot-fish keeps just ahead, and if he finds food, dashes about and flops his tail on top of the water to attract the shark's attention. Then, when the great fish comes up, he shares the meal with it. But often, when sailors throw a baited hook over the side of their ship, the pilot-fish will lead the shark to that and see it caught and hauled on board. The pilot-fish is about a foot in length, and striped with bars of a darker color upon a ground of blue.

If we consider the pilot-fish the shark's huntsman, we come next to a huntsman of a very different sort, the huntsman who shows, perhaps, more skill than any other fish in obtaining his food. This is the angling-fish, or fishing-frog, or sea-devil, whichever we choose to call it. It is an ugly creature, with a frightful mouth armed with rasplike teeth, and, as it attains a length in some waters of 5 feet, it is naturally a terror to smaller fish. But, as it moves very slowly, it has to resort to trickery. It walks along the bottom of the sea on its two broad fins. With these it stirs up the sand and mud so as to hide itself while it

FISHES THAT HUNT IN THE SEA



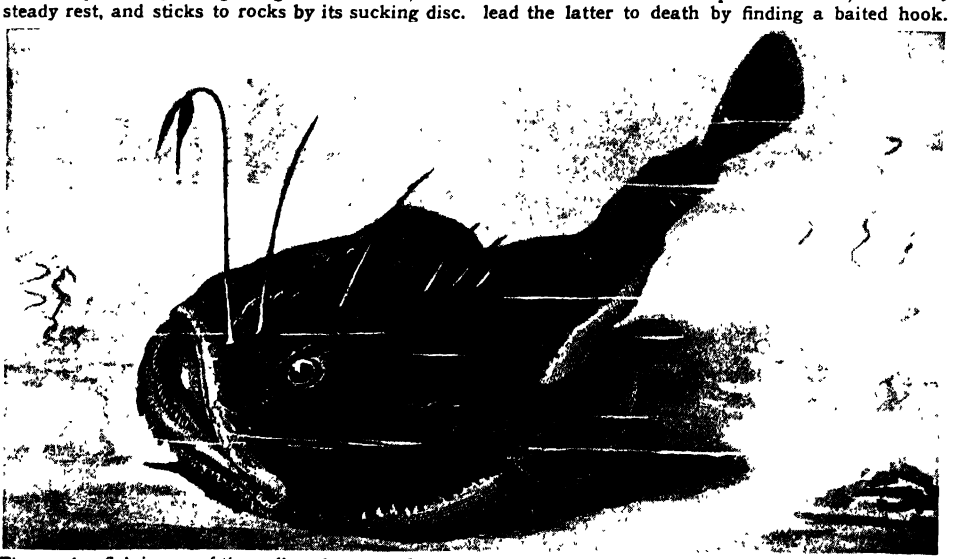
The tarpon is the giant of the herring family, and is one of the fishes upon which sharks feed. When hooked by fishermen the tarpon tries to escape by leaping into the air. Sometimes the shark seizes it as it descends.



The lump-sucker, though a good swimmer, likes steady rest, and sticks to rocks by its sucking disc.

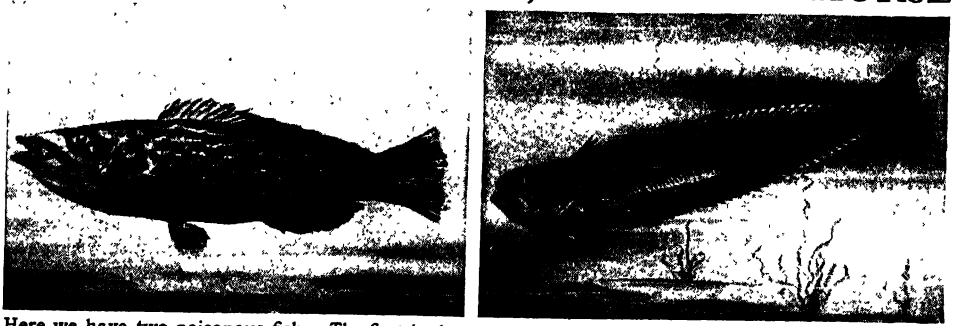


Pilot-fishes swim near ships and sharks, and often lead the latter to death by finding a baited hook.



The angler-fish is one of the ugliest, but one of the most skilful fishes. The angler-fishes of long ago were good swimmers, but modern ones lead a slothful life down at the bottom of the sea. Prevented by its habits from catching prey by speed, the angler depends upon trickery. It buries itself in the mud, but leaves sticking up a curious tentacle, which attracts other fishes, and they are then seized by the angler's terrible jaws.

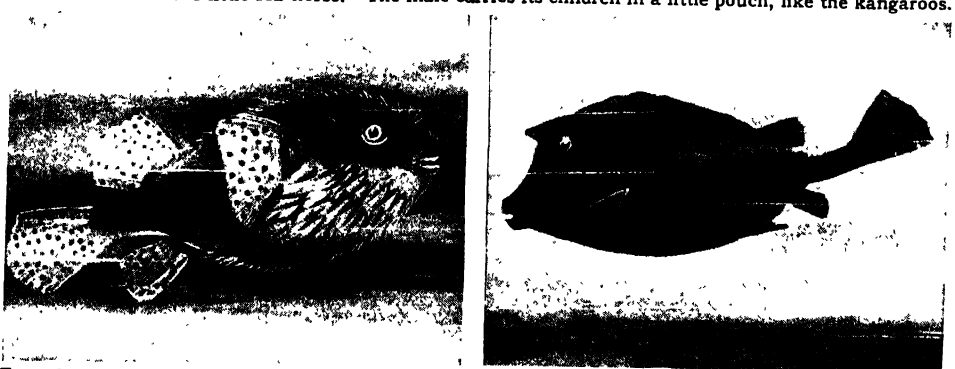
PIPE-FISH, POISON FISH, & THE SEA-HORSE



Here we have two poisonous fish. The first is the parrot-wrasse, to eat which would make us ill. The second, the sting-bull, discharges its poison into wounds made by its prickles. The fish itself forms good food.



We can see at once from its curious mouth why the larger of these fishes is called the great pipe-fish. The smaller is the famous little sea-horse. The male carries its children in a little pouch, like the kangaroos.



Two of the strangest creatures of the sea are the globe-fish, which we see on the left, and the coffer-fish. Both are poisonous as food, because they eat food from the corals, which is poisonous to us, though wholesome to them. The globe-fish inflates itself like a balloon and, guarded by its prickles, is safe from enemies.

arouses the curiosity of other fish and draws them near. This plan does not always succeed, and as an alternative the angler lies buried with a fishing-rod in action. The fishing-rod is a long tentacle sticking up from the head, with a sort of fringe at the end. This the angler is able to agitate, and fish, thinking it is something good to eat, approach to seize it, to be themselves engulfed in the fearful mouth of the sea-devil.

The angler-fish gets along well enough on his fins under water, but there are smaller fish, called the mud-skippers, which do the same with theirs on land. They leave the sea or the rivers up which they have made their way, skip about on the mud, snap up flies or insects, climb trees, and, when resting, raise themselves on their fins as we do on our elbows, and watch the world around them with the most comical look.



We do not expect to see fishes climb trees, but the curious mud-skippers we see here do. They come ashore and lie snapping at flies.

All sorts and sizes of mouths and teeth are distributed among the fishes, and we now come to some which are called pipe-fish, because of the pipe-like shape of their mouths. One very famous member of this family is the hippocampus, or sea-horse. It gets its name from the fact that with its bright, prominent eyes, the shape of its mouth, and two little fins on the top of the head which look like the cocked ears of a horse, it presents much the appearance of that animal's head. The sea-horse is like some of the monkeys and other animals—its tail is a sort of hand to it. When it wishes to rest, it coils its tail round a piece of seaweed, and holds on to it by its tail, floating in the water, catching what food chances to come that way.

A FISH THAT CARRIES ITS YOUNG IN A POUCH, LIKE THE KANGAROO

Another interesting feature about this pretty pipe-fish is its resemblance to the kangaroo. The male collects the eggs which the female lays, and stores them in a little leathery pouch which he has under his body. There the eggs hatch, and when the little fish are born this pouch is their cradle, and a refuge to which they always repair in time of danger. Most of us who have read as far as this have agreed that there are many sorts of fish which we should not care to eat.

THE POISONOUS FISH AND THE STINGING FISH THAT SWIMS IN MANY WATERS

Some of the fish are poisonous at all times, others are poisonous at certain periods of the year. Some of the latter are to be found among the strange and often beautiful fish which haunt the coral beds. The food that they eat contains poison, and its power is exercized upon people who eat the fish. Among those always poisonous are the parrot-wrasses, West Indian herrings, and certain kinds of file-fish, coffer-fish, and globe-fish. The last three are very curious fish. The coffer-fish is enclosed in a framework like a box; the file-fishes have teeth like files; the globe-fishes are the hedgehogs of the sea, prickly things, as bad to handle as a ball of spikes. Some of them can inflate themselves with air, like a balloon, and then they float at their ease, safe from attack because of their deadly spines. There is a fish in English waters, the *sting-bull, which carries a nasty poison,* but makes excellent food. Measuring from a foot to seventeen inches, it is armed with sharp prickles along its back. If the hand of a man be pricked by one of these, the poison enters the wound, and in a few minutes he feels the pain right up to the shoulder. Three men, one after another, have been stung by one fish.

There are thousands and thousands of other fish in the sea, beautiful and ugly, good for food and poisonous; but we cannot follow them further. We must now have a look at those other interesting creatures, the animals which live in shells.

THE NEXT NATURE STORY BEGINS ON PAGE 2611.



The land crabs of the West Indies go inland from the sea to live, but return to the sea to lay their eggs. When marching down to the sea they climb walls and cliffs, nothing stopping them.

SEA ANIMALS IN ARMOUR

CONTINUED FROM 2610



AT first sight it might appear that the sea animals which live in shells would prove dull company. But that can only be so to those who do not trouble to study the lives of these creatures of the deep. We shall find that they are as interesting as anything in the whole of Nature's books. The characters for the present story are among crustaceans, the animals that live in shells or living coverings, like the crabs, lobsters, crayfish, and shrimps; and molluscs, the soft-bodied animals which are provided with shells, like the mussels and oysters. Cuttle-fish are molluscs; but we have dealt with them already. Then there are the gastropods, a sub-family including the whelk and his kindred.

Let us first consider the story of the crabs. This is a family of many sorts, not all living in the sea, placed at the head of the crustaceans. The one with which we are all most familiar is the crab which comes to table. The head, throat, and what we may call the chest are all joined together, and from here the ten legs, arranged in five pairs, grow out. They do not always present this form. When young, the little crab looks quite unlike its parents. It undergoes several changes from the state in which, lacking legs and claws, it first peeps forth into the world. The stages through which it passes show us what the crab was like in the old, old days. It attains its changes by what in the birds we call molting. Again and again it casts its outer covering, and with each new coat comes a greater likeness to its parents, until it appears before its family in a handsome little shell, with all its legs fully mailed, and its claws hard and active, ready to do battle with its enemies, or to grasp the food which it needs. When this stage has been reached, all that it has to do is to change its size, not its form.

Little crabs in full armor of shell must change into big crabs in full armor of shell, and big crabs must become still bigger. Still the molts go on. It is a very inconvenient and painful process, and so hard that very many crabs die when molting. Fancy if every now and again we, when growing, had to climb out of our skins! Well, that is what the crab must do. His fat little body has grown too big for his shell, and out he must come,

or burst. But how can he withdraw himself from that stiff, unbending mail? Nature has provided a way.

THE WAY IN WHICH THE CRAB ESCAPES FROM ITS HARD SHELL

He has strong claws and thick legs by this time, and how is he to get them through the tiny joints by which the shells of the claws and legs are fitted to the rest of the shell? He simply has to draw them back, up the shell, and through the joints. The watery condition of the flesh enables the limbs to be compressed. But it is a serious business. Think what a struggle the big male crab must have! His claws, prized by those who eat crabs, are so big that they make him worth five times as much money to the fishermen as the female crab is. Well, they have to be dragged out of the old shell, just in the same way as have the smaller claws of the female. There is no royal road to freedom from the old shell.

While the old shell is being made ready to come off, there is a new shell forming over the flesh of the crab underneath; but it is quite soft and flexible until the old one has been molted. The great effort is made, and the old shell is cast, seemingly without a rent or split in it. A soft-bodied crab crawls miserably forth, and scurries away into a crevice in the rocks to hide.

THE TERRORS OF THE CRAB WHICH HAS LOST ITS SUIT OF ARMOR

He is now as soft as can be, and any other crab would snap him up at once. It takes many hours, or it may be days, for the new shell to harden. Until that has happened our little friend is in mortal terror that some hard-shelled brute shall come along and eat him up; but when the new shell is solidified, Master Crab is ready to do battle against all the rest of the crabs. In fact, he rather likes that. He is a rascal to fight. He does not in the least mind biting off an enemy's claws; and he is just as ready to sacrifice his own. What does he care? Claws will grow again. It may take several molts to do it, but in time the claws will bud out and refit him, just like the new tails which grow on the lizards, of which we have often read.

We have several species of crabs around our coasts. There are the blue crab; the green crab, which is not often eaten in this country, though its near relative is highly esteemed as food in Europe. We have the beautifully colored lady crab, the mud crab, the rock crab, the Jonah crab. Then there are the slender spider crab and the interesting little pea crab, or oyster crab.

The pea crab is an interesting variety. Like the hermit crab, it goes into hiding. But instead of taking up its home in an empty shell, it dives into the open shell of a living mollusc, and there lives like the hermit in an anemone, sharing the food which, by opening and shutting its shell, the mollusc draws in.

The blue crab is the crab that we know so well as the soft shell crab. After this crab has molted its hard shell, while the new shell is still soft, the flesh has a more delicate flavor, and it is when it is in this state that fishermen are anxious to catch it and send it to market.

THE MARCH OF THE CRABS OVER WALLS AND CLIFFS TO THE SEA

Other crabs are more interesting crabs than these. Some of them have made themselves so much at home on shore that they have altered the character of their breathing. Most of the crab family breathe by way of gills, but some can actually be drowned in water. Some crabs frequent fresh-water streams and ascend mountains. One of the most remarkable is the West Indian land crab. Here is a creature which makes its home two or three miles from the sea. But when the females wish to lay their eggs, they do not lay them and carry them attached to their bodies as most crabs do; they must make their way back to the sea to lay them in the sand. So all the crabs gather together into an army, the males leading the way.

There may be enough to form a host more than a mile long and forty yards wide. On they march, regardless of all obstacles. They go on as resolutely as the lemmings. Houses and walls and cliffs do not stop them. They never turn aside, but keep straight on, though hundreds may be killed in the climb. Arrived at the sea, the females lay their eggs, the annual migration is at an end, and the old ones are free to make their way back inland.

Another land crab, called from its

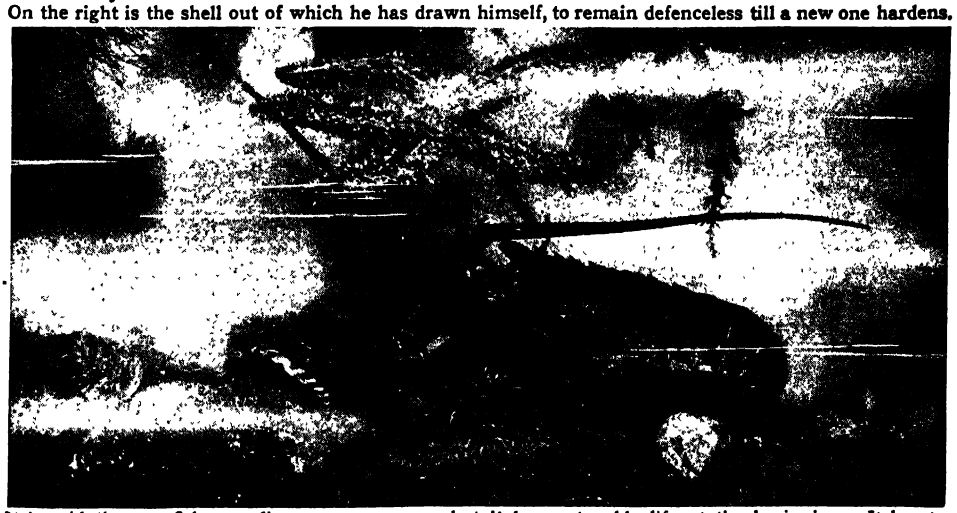
CREATURES THAT GIVE UP THEIR SHELLS



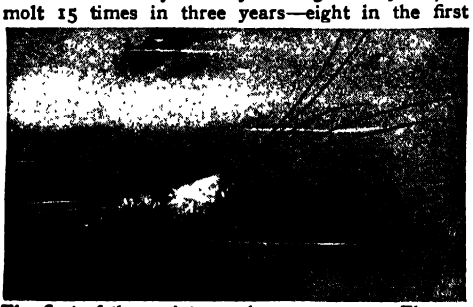
The lobster after it has been cooked is bright red, but when alive is bluish black. Here we see one in all the glory of its armor of shell, ready to do battle with the best of lobsters, for any cause or no cause at all.

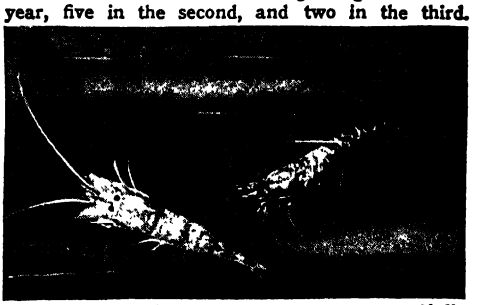


Now we may see the difference between the lobster with his shell and without. On the left he has no armor. On the right is the shell out of which he has drawn himself, to remain defenceless till a new one hardens.



It is said the crayfish may live 15 or 20 years, but it has a terrible life at the beginning. It has to molt 15 times in three years—eight in the first year, five in the second, and two in the third.





The first of these pictures shows a prawn. The second is a picture of shrimps. Prawns are beautifully colored and armed with a notched spear. Shrimps, to avoid enemies, are colored just like the sandy water in which they live. They have such a powerful sense of smell that even blind shrimps readily find food.

The photographs on these pages are by W. B. & S. C. Johnson and others.

fleetness the swift land crab, does not go so far from the water; but, still, it cannot remain long in the sea. These crabs live together on the beaches, each making a burrow for itself. When threatened with danger, they run with great speed to their holes. Should a crab get to the wrong burrow, the owner makes a scraping noise, and the lost one bolts off, braving the danger from any foe in the open in preference to entering the home of one of its own kind. Another famous land crab is the calling crab. One of its claws is extremely large, and as the crab runs—which it does with great speed—it holds this claw aloft as if beckoning. In the southern states it is sometimes called the fiddler crab. All crabs are supposed to possess intelligence, and this one certainly does. He makes a big burrow to live in, which is a foot or more in depth, and is very particular to keep his home clean and tidy.

Japan has a large crab in which we are much interested. Its flesh is good for food, and thousands of tons of its flesh are packed every year in wooden lined boxes and brought to this country.

THE SURPRISING CLEVERNESS OF SOME OF THE CRABS

The wonders of the crab family are not yet exhausted. Some of the species carry anemones in their claws to hide them either from enemies or the creatures which they mean to attack; some permit other shell-fish to settle upon them, so gaining shelter from observation. But the strangest of all is the crab which lives on cocoa-nuts. This is called scientifically the birgus latro, and lives in the islands of the Indo-Pacific seas. The biggest of all the crabs, it makes its home by burrowing deep at the roots of the cocoa-nut trees, and its food comes from the nuts which fall. Taking a fallen nut, it strips off the fibre with its great claws, then hammers away at the "eyes" of the nut until an opening is made. Through this opening or openings the crab thrusts its smaller claws, and so drags out the meat of the nut. It may even thrust in the smaller claws and swing the nut bodily upon the ground to smash it. This crab is good for food. The natives melt it, and obtain from its body as much as a quart of pure oil, which it has derived from the cocoa-nut.

HOW THE LOBSTER LOSES CLAWS IN BATTLE AND GROWS NEW ONES

In one respect the crab has his equal in the lobster—that is, in the matter of fighting. Lobster will fight lobster without the least provocation, and the warriors will sacrifice their limbs with as little to-do as a crab, and repair the loss more quickly. They can always grow a new claw to replace one which has been lost, but, naturally, it requires more than one molt to make the new one as *large* as the old. As we all know, the natural color of the lobster is a bluish black; but when it has been boiled it changes to a brilliant scarlet. Like the crab, the mother lobster carries her eggs about with her. She lays them in the autumn, and they hatch in the following midsummer.

Lobsters are found on the Atlantic coasts both in Europe and America. The American lobster is closely related to the European lobster, but is not quite the same, and is larger. It is found from Labrador in the north as far as Delaware to the southward. Lobsters are also found in the Pacific, but as they are not of so fine a flavor, efforts are being made to introduce the Atlantic lobster to the western coast.

A flourishing lobster fishery is carried on in the north-eastern states and in the Maritime Provinces of Canada. Unfortunately the fishermen are so foolish that the lobsters are in danger of being killed off, and the governments of both the United States and Canada have had to take steps, by saving the eggs in hatcheries, to re-stock the lobster grounds. Laws have been made in both countries to protect young lobsters until they have grown large enough to produce eggs, but these laws are not always kept.

THE HARD LIFE OF THE YOUNG CRAYFISH WITH ITS MANY SHELLS

The young lobsters are capital swimmers, but they do not swim away from their crawling parents. The mother lobster is a really good old lady, and loves her babies. She may be seen hiding under a rock with her big claws sticking out, and the little ones playing between them. At the first sign of danger she rattles her claws, and the baby lobsters immediately run under her body for shelter.

The molt of the lobster is an even more serious matter than that of the

crab, for not only does it cast its shell, but it actually casts the membrane by which its stomach is lined. In this, lobsters are resembled by the crayfish, the fresh-water lobster, which many people eat. It is easily distinguished by its smaller claws. Little crayfish have not to begin in so strange a form as the crabs and lobsters, being more like their parents, but they have a hard life of it. Eight molts have to be got through in the first year, five in the second, and two in the third. After every molt the crayfish is soft and helpless until the new shell hardens. A species of crayfish which is found in the Mammoth Cave in Kentucky is quite blind.

THE GORGEOUS PRAWNS, AND THE SHRIMP THAT BURIES ITSELF IN THE SAND

The next step in the family takes us to the shrimps and prawns. Some of the latter, in the West Indies and in Central America, are nearly as big as lobsters. In northern waters, they are smaller than this, but those of good size are awkward creatures to handle. The long, sharp, saw-like spear with which they are armed inflicts quite bad injuries upon the hand, unless the fisherman be very careful. The shrimps are the small relations of the prawn. They are not so handsome as the prawns, which are often beautifully streaked with color. The shrimps are, however, very active and graceful, and are so nearly like their surroundings that it is very difficult to see them when they are at rest. But that is not often. In the shallow pools where enemies cannot overtake them, they are so active that we have to be very alert with the net to make a catch. Where fishes which eat them abound, the shrimps hide during the day and wait for their food until night. They dig holes in the sand by excavating with the hind legs, sinking part of the body into the hole, then throwing the sand over themselves. Prawns and shrimps undergo the molting process like crabs and lobsters, and, like them, have a keen sense of smell, which guides them to their food.

THE WONDERFUL LITTLE SCAVENGERS WE MAY ALL FIND ON THE SEASHORE

Nearly related to the shrimps are those curious little things, the sand-fleas, which we find in the sand upon all our beaches. They are first-rate scavengers, and help to keep the beach healthy when the tide is out. They will eat anything—carrion or decaying seaweed. Their jump is accomplished by bending the body, then suddenly flinging it open, like the bending and relaxing of the bow which sends the arrow speeding to its mark. On many coasts we find the sand-screw, which has to wriggle along on its side when the surface is dry, but moves with speed when moisture eases the way. Related to these is the corophium, a twelve-legged little creature with two immense horns. With the latter it beats the ground most carefully to find its pet food, the fat lugworms which live head downwards in the sand and mud of the seashore. The lugworm or lobworm is bigger than the worm that we see in the garden, but twenty or thirty of these little animals pounce upon it and destroy it, just as we see ants destroy a caterpillar.

It is in the same family that we find the gribble and the wood-shrimp. These do great damage to timber by boring tunnels in it. But we can leave their performance and pass on to the molluscs to find two famous examples, the pholas and the teredo. The pholas, which is more commonly called the piddock, is a soft-bodied creature in a fragile shell, found in Europe. It can bore its way into the hardest sandstone, limestone, slate, or wood. Portland stone seems to be too much for it, because of the flinty nature of that formation. The pholas makes its two shells its hammer and chisel.

A SOFT BORER WHOSE WORK TAUGHT A MAN HOW TO MAKE A TUNNEL

It first protrudes a stout foot, and, with this to act as a sucker, it glues itself to the stone upon which it is to work; then, by the action of its shell, it slowly and laboriously grinds itself into the hard material. When it has got far enough in to make itself a home, it rests content, and burrows no farther.

The teredo is more feared and disliked than the pholas, for it does enormous damage to wooden ships, and to the timber defences of harbors, wooden supports of bridges, and so forth. It has the appearance of a long, whitish worm, about an inch in circumference, but from 12 to 30 inches in length. It can eat its way through any sort of wood, though, naturally, it prefers some

to others. Not content with making a channel for itself through the solid timber, it builds a tunnel of calcium carbonate wherever it goes. Thus it can move freely, and at the same time be sure that its boring will not cause the woodwork to collapse upon it.

The teredo is found all over the world, and is very destructive to wooden ships and piling. At one time it did so much damage to the dykes in Holland that it seemed possible that the sea might sweep in over the land before the injury could be repaired. In this country we have commenced to guard against its ravages by using stone and cement for harbor work instead of wooden piling.

Now we come to armored animals which like the mussels and clams and oysters are called bivalves. The teredo is a bivalve too, but grows out of its shells. That means, of course, that their soft bodies are enclosed in a shell consisting of two valves or halves. The shells work upon an elastic hinge, and close by a muscle which is very strong. Some mussels yield pearls, as the oysters do. They are not so fine as those of the Oriental oysters, but mussel pearls have long been famous. It was in order to secure British pearls that the Romans first went to England, so the mussels may have played a part in attracting to that country the first civilizing influence it ever knew.

THE TRAVELS OF THE BABY MUSSEL ANCHORED TO A FISH

Pearl mussels are found in many of our rivers. Some of the pearls found are very valuable, and numbers of the smaller pearls that we see in the shops come from this source. Quantities of pearl buttons are made from the lining of the shells. One very interesting feature of their career we must notice. They make their pearls to get rid of the discomfort caused either by an egg remaining in their shell, or by the intrusion of a grain of sand or some other unwelcome body. They do not like parasites, but they themselves are parasites in the early stages of their existence. The young ones, when they leave their mother, have two little hooks attached to their shell. With these they fasten themselves to a fish, and there they cling and grow until they are large enough to set up house for themselves. Then they sink to the bottom of the water and grow into big mussels. The young mussels require particular fishes to which to attach themselves, and in the great nursery which the government maintains on the Mississippi, these fishes are provided for them.

Mussels live in the sea also, and sea mussels are quite as good to eat as oysters.

SPINNING SILK IN THE SEA TO MAKE AN ANCHOR FOR THE MUSSEL

In speaking of the oysters and mussels, we say that they, in common with other bivalves, "attach themselves" to the rocks, or whatever it may be. But how can creatures whose outside consists only of hard shell attach themselves to hard, slippery rock, or the hard, slippery shell of some crustacean? The reason is that they spin a sort of silk. "Spin" may be a strange word to use, but that is what it really means In nothing else is this operation better carried out than in the sea mussel. The mussel has a foot, like the pholas, and this acts as a sucker, to hold the creature to the rock. But that is only a temporary anchorage.

From the interior of the mussel is spun what we call its byssus. Strands of silky texture are put forth by the mussel and woven into a sort of string. This holds to the rock or timber or even smoother surfaces. Mussels collect together in great masses, such as many of us have seen at the seaside, and, no matter how the heavy waves beat upon them, they hold their positions in safety. Each mussel spins its own byssus, but it joins its own to that of its fellows. They make all the separate ropes into one strong rope. From this central rope all of them depend.

Engineers know the strength of the mussel's rope. When the breakwater at Cherbourg was being built, the French engineers deposited several thousands of mussels upon the loosely piled masses of stone, knowing that these little creatures would bind the whole together with their silk better than any cement made by hands could bind it.

Clams are bivalves also, but they do not fasten themselves to the rocks. The hard shell clam, sometimes called the quahog, has strong shells with a very sharp edge. It lives in the shallow waters along the eastern coasts, and moves itself along the sandy sea bottom

LITTLE WONDER-WORKERS OF THE SEA



Wherever there is damp sand at the seaside we may expect to see sand-hoppers, the best of scavengers.



This mollusc can bore its way into rock which would blunt a strong chisel. It is the pholas, and makes the two halves of its shell its hammer and chisel.



The lug-worm, nearly a foot long, lives in the sand and mud of the shore.



The teredo, which can riddle wooden ships, is seen here in its tunnel.

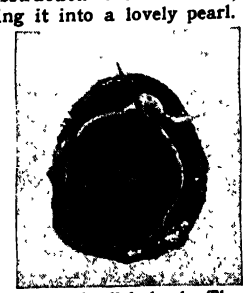


The oyster shown here is of the sort which, getting sand or some other obstruction into its shell, covers it all over, making it into a lovely pearl.



The mussel clings to a rock with its sucker-foot, then spins a rope of silk and hangs so fast that the most powerful waves cannot tear it away.





Limpets cling to rocks, and cannot be dislodged. The sucker-like foot on the right explains the mystery.



The whelk is an enemy of nearly all other shell-fish.



The periwinkle is a friend to young oysters.

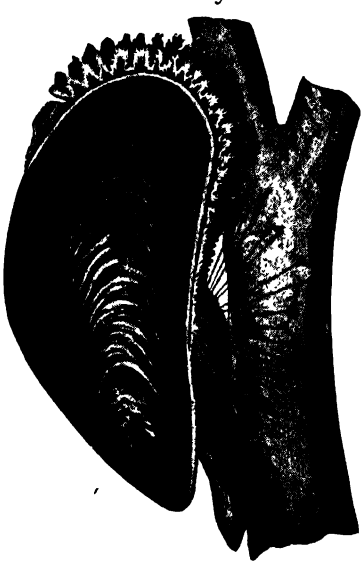
with the sharp edge of the shell. Young hard shell clams are known as little neck clams. Hard shell clams are gathered in with rakes, but soft shell clams are caught in a different fashion. Soft shell clams live buried in the sand above low-water mark. They dig themselves down with a strong muscle, called a foot, and lie just below the surface of the sand where they can breathe. When the tide goes out, clam gatherers follow it down the beaches, dig up the clams, and send them to market. Other clams, such as the razor clam and the painted clam, are found on the Atlantic coast, but are not eaten.

Many of us who have never been near the New England shores have heard or read of the fun and frolic at clam bakes and shore dinners. It is the juicy soft shell clam that is used on these occasions. The razor clam, which has a narrow knife-shaped shell, is used only for bait.

Clams are found in Europe, but are not much used for food, and in India there is found an enormous clam which weighs over four hundred pounds. The shellfish which is called a clam on the Pacific coast belongs to another family.

Scallops are much larger than clams or mussels, and those that live in the Gulf of St. Lawrence and across the bleak Labrador shores are sometimes four or five inches across the shell. Some scallops have a byssus like the mussel, but generally they do not attach themselves to the rocks. The young scallops hatch out of the eggs in two or three days, and are quite grown up in a couple of years.

The great muscle of the scallop is very large, and it is this part of the fish that is eaten. That is why the scallop as sold by the fish-markets gives us no idea of the beautiful bivalve from which it comes.



The mussel has clung to a support and can now defy the waves. His sucker-foot clings to the log, and he is further secured by the strands of silk which he has spun.

THE OYSTER THAT SWIMS IN ITS BABYHOOD

Most of us know the rough grey shell of the oyster, for it can live so long out of water that it is possible to send it long distances from the sea-coast. Oysters might almost be called the national dish in the United States, and actually half a million acres of shore line and shallow water on the coast are devoted to their cultivation.

When the young oyster is born, it is so small that it cannot be seen with the naked eye. In this stage of its life, it swims about, and is sometimes carried by the current miles away from the place of its birth. Millions and millions of young oysters in this stage are eaten by fish, and millions more are swept away by the waves. How long they swim about, we do not know; but it may be about a week or so. They soon settle down, however, sink to the bottom, and attach themselves to rocks, sunken logs, or anything else that will give them firm hold, and there they live for the rest of their days. In oyster farms, tons of old oyster shells are spread over the bottom to give the young oysters, or spat as they are called, a good resting-place. Oysters lie with their shells gaping open, so that the water may flow through, and thus bring them food and enable them to breathe.

There are at least a hundred different varieties of oysters in the world. They are eaten almost everywhere, and are so much esteemed as food that they have been cultivated for centuries. The Chinese have had oyster farms for at least two thousand years, and the Italians began their cultivation about 100 B.C. Pearl oysters are described on page 189, and we may read about the oyster fisheries in the story beginning on page 1341.

Whelks and periwinkles are not used for food in this country, but are prized by some of the people in Europe. They are univalves, that is, they have only one shell. The periwinkles live on sea vegetation, but whelks are carnivorous.

THE NEXT STORIES OF NATURE ARE ON PAGE 2699.



WOMEN WRITERS OF ENGLAND

CONTINUED FROM 2498



BEFORE the later years of the eighteenth century there are few, if any, women writers we need read about. But to know even a little about the history of the women writers is to understand a very great change that has taken place in regard to the position of women in our times. From very early times men wrote all sorts of books, but until about a hundred years ago it was thought that the writing of books was no work for women. The great-grandmother of Maria Edgeworth, one of the famous writers we are to read about, thought that a lady need not be educated beyond the ability to know her Bible, and to make up the weekly accounts of the household. This was something more than a hundred years ago, and that old-fashioned lady only spoke what most of the ladies of her time believed. We, living in a day when quite as many books are written by women as by men, can see how greatly times have changed.

It is often said that women cannot rise to the heights achieved by men in the various arts. But while this may be true—for there is certainly no woman's name that can be ranked with Shakespeare or Milton or Scott—some women have written books which no man has excelled. This cannot be said of the first woman writer with whom we are concerned; yet the name of Fanny Burney, which, in point of time, must head the procession of brilliant English women writers, is likely to remain famous, and her works will probably be read as long as most of those written by the story-tellers of whom we have read in the BOOK OF KNOWLEDGE. Fanny Burney was born at the town of Lynn, England, June 13, 1752. Her father, a distinguished musician, had gone there as organist and music-teacher because his health was delicate; but he afterwards returned to London, where he lived to the ripe age of eighty-eight, and was the friend of most of the eminent men of his day. The great Dr. Johnson; Sir Joshua Reynolds, the famous artist; Edmund Burke, the philosopher; and Garrick, the greatest actor of his time, were among the notable visitors at the home of Dr. Charles Burney.

Fanny Burney was just eight years of age when her father re-

turned to London, and a more shy or backward child it would be difficult to imagine. All her brothers and sisters were bright and promising children, but Fanny gave not the slightest hope that she would ever do anything remarkable. At eight years of age she did not even know her A B C, and so quiet and retiring was she that she was in danger of being neglected altogether, not only by the famous visitors to the house, but by her father and her stepmother.

FANNY BURNEY, "THE LITTLE DUNCE," AND HOW SHE BEGAN TO WRITE

Yet the little girl's very modesty attracted some people, and when her stepmother, an estimable lady, was accused of not paying Fanny sufficient attention, she replied that "she had no fear about Fanny," and refused to waken up "the little dunce" by using the rod, as had been suggested.

Fanny was, indeed, only another proof that it is not always the bright and lively child that grows into a clever man or woman. For had it not been for what this little dunce achieved in later years, the name of Burney, and perhaps even her father's own fame, would have been quite forgotten long ago. As soon as Fanny did learn her letters she became a great reader; and almost as soon as she could read she began to write stories.

At first this was thought mere child-play, and she was allowed to scribble away to her heart's content; but when she was sixteen or seventeen she had written a large number of stories, and her stepmother pointing out to her how unladylike it was to think of being a novelist, Fanny one day made a bonfire of all her writings, and resolved to invent no more stories.

A GREAT STORY THAT WAS WRITTEN IN SECRET BY A YOUNG WOMAN

We may be sure the world lost nothing by the bonfire; but among the stories which she burned was one that had so engaged her imagination that, before very long, she found the temptation to weave it over again too strong, and though she still refrained from writing, she composed in her mind the whole of the new story which had grown out of the one she had burned. It would, indeed, have been a pity if she had kept her word to write no more, for then the world would never have read that most charming of her stories, "Evelina."

It was by stealth she wrote it, however, so that neither her father nor her stepmother should know; and although it was not published until she was twenty-three years old, it had probably been finished long before then. So little did she estimate the value of the book, that she sold it to her publisher for $100; and though it was printed without her name, her father soon guessed that it was the work of his daughter, and realized that his daughter was a genius. "Miss Burney is a real wonder," was Dr. Johnson's opinion of her on reading the book, which is full of a deep and true knowledge of life, such as we should only expect from a person of mature years, and not from a mere girl.

Before long, Fanny Burney became famous; she was the lion of the literary and fashionable world of her time, and her second novel, "Cecilia," published four years later, was also a great success. Becoming known to the royal family, Queen Charlotte appointed her second Keeper of the Robes, a post which she soon was glad to give up.

WHAT FANNY BURNEY DID FOR ENGLISH LITERATURE

When she was forty, Fanny Burney married a French general named D'Arblay, who had been driven to England by the Revolution in France. Although her third story, "Camilla," brought her the great sum of $15,000, it is not so good as her others, and her last novel, "The Wanderer," earned $7,500 for her, yet it also does not compare with the first two.

Madame D'Arblay, as, of course, Fanny Burney was called after her marriage, did a great service to literature by showing how to write a story that could illustrate both the high and the low life of the day in simple, unaffected language, pure and wholesome in tone, and yet true to life. Her diary and letters fill many volumes, and are almost as famous as her novels, so that we see a "little dunce" may sometimes be only another term for a genius. Madame D'Arblay died on January 6, 1840.

Not many men have so large a family as twenty-two, but Doctor Charles Burney, the father of Fanny, was his father's twenty-second child. and, curiously enough, Maria Edgeworth, the next famous woman writer, was one of


Fanny Burney


Maria Edgeworth


Jane Austen


Jane Porter


Mary Mitford


Mrs. Gaskell


Charlotte Brontë

twenty-two children. She was born on New Year's Day, 1767, at Black Bourton, near Oxford, and although we usually look upon her as an Irish woman, because most of her long and useful life was passed in Ireland, she was of pure English descent. She describes herself as "a New Year's gift" to her father, and between the two there was a lifelong affection, as they were almost inseparable. Her mother died when Maria was a child, and her father married three times afterwards, so that Maria had three stepmothers, with whom she seems to have lived happily.

From her earliest years Maria had a passion for story-telling, but she does not appear to have written so much as Fanny Burney did. Certainly, there is no record of her having to make a bonfire of her childish scribblings. We are told that when she was thirteen she wrote a story called "Generosity," of which her father said: "It is excellent and extremely well written, but where's the generosity?" When she was fifteen, her father settled in Ireland, where he had a beautiful house called Edgeworthstown, and there, with a fine library to roam through, the girl had every encouragement to engage her literary tastes. Her father, a very clever man, helped her with her early writings, though these are the least important of her works. Unlike Fanny Burney's stepmother, Richard Edgeworth recognized his daughter's ability. When she was a young woman of twenty-four, he urged her to write anecdotes of the children he was educating, and the first book they wrote together was called "Practical Education."

She wrote many stories and essays, of which the chief are "Castle Rackrent," "The Absentee," and "Ormond," all of which describe life in Ireland in a vivid and truthful way, though they have the fault of being inclined to sermonizing. Sir Walter Scott was a great admirer of her works, and, indeed, her sound common-sense was approved by all the great people of her time. Whenever she went to London, she was a centre of literary interest, and although rather a plain woman, all who knew her seem to have been delighted with her character. In 1823 she made her memorable visit to Sir Walter Scott at Abbotsford, and her long life came to an end on May 22, 1849. It is worthy of note by those who suppose that, as we grow old, the time for learning has passed, that Maria Edgeworth began to learn the Spanish language when she was eighty-two, only a few months before she died!

Jane Austen was the name of one of the greatest and earliest story-tellers. She was born on December 16, 1775, at Steventon, in Hampshire, where her father was the rector. This quiet old rectory was her home for twenty-five years, and Jane, the youngest of a family of seven, all


Emily Brontë


Anne Bronte


"George Eliot"


Mrs. Lynn Linton


Charlotte M. Yonge


Mrs. Craik


Mrs. Oliphant

the rest of whom were boys, had the advantage of receiving from her father, who took pupils for instruction, an education as good as any of her brothers.

JANE AUSTEN, THE CLEVER GIRL WHO BECAME A GREAT WRITER

Indeed, Jane Austen was quite exceptionally educated for a woman of the time, and we have to bear in mind that a hundred years ago English people, as a whole, were not so well instructed as they are to-day. Even the wealthy people of the country were very badly educated, and the clergyman was very often the only person of any learning in his village. Jane Austen's father was once addressed by a rich squire to this effect: "You know all about these things. Do tell us. Is Paris in France or France in Paris, for my wife has been disputing with me about it?"

Jane was a great reader; all the best-known writers of English literature were known to her. French and Italian she knew also; but she was by no means a girl who neglected household duties to pore over her books. She seems to have been in every sense a healthy, happy, and beautiful country maiden, with a singular gift for telling stories. As soon as she could write, she began to practise the making of tales, and later, when she set herself in real earnest to write long stories which were to be printed and sold everywhere, she found it so easy to compose her tales that she could go on writing them even with visitors in her room, to whom she would talk from time to time. We see her at her desk in the picture on page 2619.

WHAT THE GREAT SIR WALTER SCOTT SAID ABOUT JANE AUSTEN

Her first story was called "Sense and Sensibility," and was one of three fine novels which she wrote at Steventon between the ages of twenty-one and twenty-three, although it was not printed until 1811, when she was thirty-six. The other two were "Northanger Abbey" and "Pride and Prejudice." The last, together with two other fine stories—"Mansfield Park" and "Emma"—were published during her lifetime, but "Northanger Abbey" and "Persuasion," which complete the list of her books, were not printed until after her death, July 18, 1817. Her name was not given on any of her novels until after her death, so that she enjoyed but little of the great fame she might have won in her lifetime; but her name will live as that of one of the great novelists, for no one has excelled her in describing the quiet country life and the character of country people in England a hundred years ago. Sir Walter Scott read "Pride and Prejudice" three times with great delight, and said of Jane Austen: "The big bow-wow I can do myself like anyone going, but the exquisite touch which renders commonplace things and characters interesting, from the truth of the description and the sentiment, is denied to me. What a pity so gifted a creature died so early!"

Women were now venturing more and more to come forward as story-writers, and instead of it being thought a disgrace for a young lady to write a romance, as in the days of Fanny Burney, people were perhaps too ready to see merit in a story that had been written by a young woman.

JANE PORTER, WHO WROTE THE STORY OF "THE SCOTTISH CHIEFS"

Perhaps that was why Jane Porter, who was born at Durham in 1776, could have become famous in 1803 by writing a high-flown romance entitled "Thaddeus of Warsaw." It is certain that the book would not attract so many readers to-day, and when we look into it, it is difficult to believe that many thousands were delighted by it a century ago. The Grand Duke of Würtemberg even conferred a distinction on its author by making her a canoness of the order of St. Joachim! Just as fashions change, so does the taste for reading, and our great-great-grandparents were simpler-minded than we are to-day, and perhaps easier to please. Jane Porter wrote another book entitled "The Scottish Chiefs," which has often been reprinted, although its hero, Sir William Wallace, cuts an absurd figure compared with the scores of splendid historical characters that appeared in Scott's novels.

Jane Porter was really a celebrated novelist years before Scott wrote "Waverley," and the fact that people immediately turned with delight to the stories of Scott shows that they only read Jane Porter's for lack of better ones. Her sister, Anna Maria, also

wrote a great many novels, and her first book, entitled "Artless Tales," was published when she was only thirteen; but she does not rank among the women writers of note, and Jane Porter herself, who died May 24, 1850, is chiefly interesting because of the fame which she won in her own day, and not because of any enduring merit in her stories.

Mary Mitford, the daughter of a spendthrift physician, was born at Alresford, in Hampshire, on December 16, 1787, and began her literary life by publishing a book of poems when she was twenty-three. She wrote plays for the stage and charming sketches of country life. The best of her writings are gathered into the book called "Our Village." When Mary was ten her father bought her a lottery ticket which won $100,000; but he managed to squander the money, and Mary had to write for her living. She died in January, 1885.

Mrs. Gaskell, whose maiden name was Elizabeth Cleghorn Stevenson, was really the first notable woman writer born in the nineteenth century. She was born on September 29, 1810, at Cheyne Row, Chelsea, a place that is famous in literary history. Elizabeth was brought up by an aunt at the charming old-fashioned town of Knutsford, in Cheshire, which she was to make famous by describing it as "Cranford," in her novel of that name. We are told that she was noted as a girl for her sweet disposition as much as for her beauty, and at twenty-two she married a minister, and went to live in Manchester, where the rest of her life, so busy and useful, was spent.

Mrs. Gaskell was thirty-eight when she published her first novel, "Mary Barton." Unlike most of the other story-tellers about whom we have been reading, she did not write of men and women until she had studied them thoroughly, and what she wrote of them was not so much from her imagination as from her observation.



FANNY BURNEY DESTROYING THE MANUSCRIPTS OF HER EARLIEST STORIES

She wrote many other stories, all full of quiet charm, but she is also famous for having written one of the best biographies we possess, in "The Life of Charlotte Brontë," about whom we are presently to hear. This was a very difficult task, and Mrs. Gaskell fulfilled it admirably; but, unfortunately, she was so disappointed by the complaints of different people then alive, who disapproved of it for personal reasons, that she determined no biography of

herself should ever be written, and left strict instructions to this effect when she died at Alton, on November 12, 1865.

The next woman story-writer of note who was born after Mrs. Gaskell bore a name in later life which is familiar all over the English-speaking world, and yet she was not a great writer at all. Her maiden name was Ellen Price, and she was born at Worcester, on January 17, 1814. All her life she was delicate. As a girl she does not appear to have been particularly fond of writing stories, giving no sign that she might ever become a popular author. She married a ship-agent named Henry Wood, and went to live in France; but her husband died while he was still a young man, and Mrs. Henry Wood, after she settled in London, decided to occupy herself by writing.

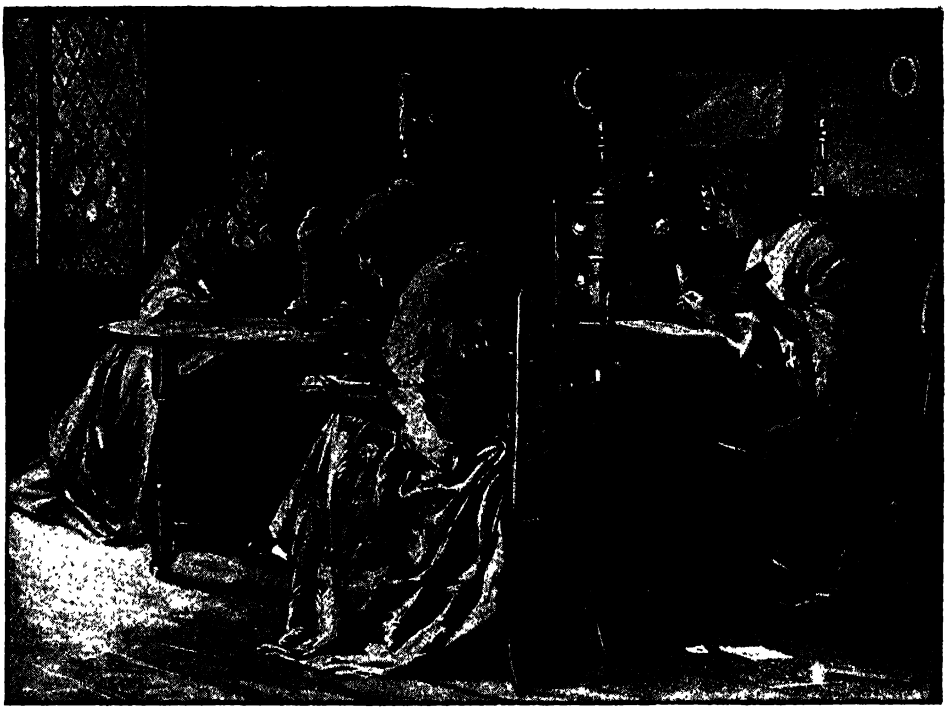
She was forty-six years of age before her first book was published, and it is interesting for boys and girls to know that this book, of which hundreds of thousands have been circulated, was written by her for a prize offered by a temperance society. The story is called "Danesbury House," and the year after it appeared Mrs. Wood wrote another story, which immediately became the most widely-read book of the day. This was "East Lynne," an improbable and needlessly tearful story; but as a great many people seem to enjoy having their feelings harrowed by stories of suffering and woe, "East Lynne" has had an enormous popularity for over half a century, both as a story and as a play; yet neither it, nor any of the books which Mrs. Wood afterwards wrote, can be described as real literature. Mrs. Wood died in London, on February 10, 1887.

THE THREE BRONTË SISTERS WHO WROTE SEVERAL FAMOUS BOOKS

We come now to three sisters whose names are among the most famous in the story of English literature in the nineteenth century. They have all been dead for more than sixty years, and none of them enjoyed long life. Indeed, the idea that great activity of the mind often goes with frailty of the body, and may sometimes be the result of the latter, has some support in the lives of the three sisters Brontë. The eldest, Charlotte, was born at Thornton, in Yorkshire, on April 21, 1816, and died



MARIA EDGEWORTH VISITING SIR WALTER SCOTT AT HIS HOME AT ABBOTSFORD



THE BRONTE SISTERS WRITING THEIR FAMOUS STORIES IN THE RECTORY AT HAWORTH

at Haworth, a village on the Yorkshire moors, on March 31, 1855. Emily lived from August 20, 1818, till December 19, 1848; and Anne, from March 25, 1820, till May 28, 1849. It will be seen from those dates how short were the lives of these three remarkable women; but, short as their lives were, their names will be famous for the work they contrived to do, despite the sorrow and hardship it was their fate to endure.

WHAT SORROW AND TROUBLE CAN DO FOR LITERATURE

Some of the finest works of literature have been the outcome of sorrowful hearts, and perhaps unhappiness has really done more in urging men and women to enlighten their fellow-men than happiness has done. Possibly, had these three women lived happy and comfortable lives in pleasant surroundings, strong in health and well supplied with money, the world would never have heard of them, and we should never have had Charlotte's great stories, "Jane Eyre," "Shirley," and "Villette," or Emily's wonderful romance of "Wuthering Heights," or Anne's story of "Agnes Grey," though the last is by no means so great a book as the others. The three girls were motherless, and their father was a gloomy and reserved pastor of a moorland village, with insufficient means to provide them with comforts. The people around them were chiefly of a rough and common class, and they were driven into their own companionship, studying and sorrowing together, and learned to write.

All were frail of body, for the seeds of tuberculosis, which had carried off two other sisters in childhood, were in each of them, and were very soon to take the three sisters in swift succession to their graves. All their knowledge of the world was obtained from a few short years at boarding-schools of the period, which were none too well conducted, but Charlotte and Emily had two years at school in Brussels, the capital of Belgium, the story of which is largely told in "Villette." Their highest ambition in those days was to become governesses, for which their gentle and sensitive natures did not fit them. Their first effort in the way of literature was a little volume of poems, published in 1846, which attracted little attention.

Each of the sisters took the name of "Bell," Charlotte calling herself "Currer Bell," Emily "Ellis Bell," and Anne "Acton Bell." When they next

tried to win success by writing prose stories they kept those names, so that, a year later, when Charlotte's romance of "Jane Eyre" won success, many people believed it to be written by a man. It is difficult, however, to imagine why anyone who has read it could think a man would have been able to express so wonderfully the mind and character of a young woman.

THE END OF THE SAD STORY OF THE THREE BRONTE SISTERS

The fame which came to Charlotte and her sisters was very soon to be shadowed by death, for Emily passed away the year after "Jane Eyre" was published, and Anne followed her to the grave in five months' time. The hand of Death was on the lonely vicarage, as the only brother had died three months before the death of Emily. Charlotte was now alone with her aged and gloomy father. The literary world would have made much of her, but her life was too much overcast with sorrow to enjoy all the fruits of the success which her pen had won, and to go on writing was all that remained to her. Her last days were a brief happiness as the wife of her father's curate, Arthur Bell Nicholls, whom she married less than a year before her death.

When the Brontës were little children away on the Yorkshire moors, another little girl, whose name was Marian Evans, was playing about the farmhouse of Griff, near the town of Nuneaton, amid the sunny fields of leafy Warwickshire. She had been born on November 22, 1819, at Arbury Farm, where her father, who was the land-agent on the beautiful estate of Arbury Hall, was then living.

THE SCHOOLDAYS OF THE GIRL WHO WON FAME AS "GEORGE ELIOT"

Marian went to school at Nuneaton in a plain little schoolhouse which still stands beneath the shadow of the old parish church, but later she was at a boarding-school in the historic town of Coventry, and there, as a girl in her "teens," the preaching of some evangelist made a great impression on her, so that she began, while still young, to think seriously of life. She had a great love for her mother, who died when Marian was seventeen; her elder sister passing away a year later, Marian became the housewife of Griff Farm at eighteen.

But she was no ordinary mistress of a farm, for she had teachers of German, Italian, and music, who came over regularly from Coventry to give her lessons in these subjects, so that she became an accomplished scholar in languages, and was always a passionate musician. The long leisure of country life was also a boon to her, for she was a great reader, and there can have been few women of her age so widely read as Marian Evans. When she was twenty-two she went to stay with her father at Coventry, and there she began her first literary work, translating from the German a famous "Life of Jesus." She stayed at Coventry until the death of her father, which took place in 1849. She then traveled abroad for some time, and in 1850 settled in London as a writer and translator.

GEORGE ELIOT'S FIRST STORY AND HER OTHER FAMOUS BOOKS

So far she had done nothing that would have made her famous; but she had rather the mind of a man than of a woman, and her bold and courageous views of life soon made her the centre of a literary circle in the great city, or, indeed, wherever she went. She was thirty-seven when she attempted her first story, "The Sad Fortunes of the Rev. Amos Barton," which was published in "Blackwood's Magazine." This was one of the stories afterwards published as "Scenes of Clerical Life," in which, with remarkable genius, she made use of many living characters in and about Nuneaton.

All who had taste for good literature realized at once that a new writer of great power had arisen, and as she now signed herself by the name, "George Eliot," anyone might have been excused for thinking that the stories were the work of a man, so strong and true was the grasp of character, so deep the insight into human nature. No English woman had ever before and none since has shown such power. Her most famous book, "Adam Bede," was published when she was forty, and she wrote many others before she died at Chelsea, on December 22, 1880. Some of these, such as "The Mill on the Floss," "Silas Marner," and "Romola," rank among the greatest of English novels. It may be said of George Eliot that she enlarged the scope of the English novel, and

proved to the world that a story can be at once a source of pleasure and entertainment, and yet full of the wisdom of life and a help to the understanding of human nature.

All the other women writers of the nineteenth century that call for notice here are far below the Brontës and George Eliot in their gifts of mind and their literary power. Mrs. Lynn Linton, who was born on February 10, 1822, and died on July 14, 1898, enjoyed a long and useful life, during which she wrote many stories and essays: She was a lady of great personal charm, and in every way the model of a self-reliant, courageous woman of the old-fashioned type, but her stories are not likely to engage the readers of a later generation. Mrs. Linton knew George Eliot, and among the last of her writings were some reminiscences of that famous woman.

MISS YONGE'S STORY "THE DAISY CHAIN," AND HOW IT BUILT A COLLEGE

Miss Charlotte M. Yonge was a story-writer of much the same standing as Mrs Linton. She is famous for her story "The Heir of Redclyffe" and her book of Golden Deeds, and she wrote altogether some 120 volumes of fiction, most of which were very successful. She was greatly devoted to missionary work, and part of the profits of the story just mentioned were devoted to fitting out a missionary schooner for cruising in the South Seas. Another of her books, "The Daisy Chain," brought $10,000, and this large sum of money she gave to build a missionary college in New Zealand. Miss Yonge was born on August 11, 1823, and died on March 24, 1901.

A more notable writer than either of the last two named was Dinah Maria Mulock, author of "John Halifax, Gentleman," who was born at Stoke-upon-Trent, on April 20, 1826. This lady went to London and wrote a number of successful stories before she was thirty years of age; but "John Halifax" is her most notable achievement, and few novels of the nineteenth century have been more widely read. She also wrote many poems worthy of remark, and was a clever essayist, but she will always be remembered as the creator of John Halifax. Some twenty years before her death, which took place on October 12, 1887, she married Mr. Craik, and she is more often spoken of as Mrs. Craik than under her maiden name.

A BRAVE SCOTSWOMAN WHO KEPT HER FAMILY BY HER WRITINGS

Another delightful woman story-writer, who resembled in many ways Mrs. Lynn Linton, was Mrs. Oliphant. Although she does not rank with the highest, she wrote many stories of much charm, and a number of fine books of an historical character. The story of her own life would be quite as interesting as any in a novel, for she was a brave and good woman who, after her husband's death, earned a livelihood for her children with her pen. How much she had to fight against we can guess, from these words written by herself: "When I thus began the world anew I had for all my fortune about £1,000 of debt, a small insurance of, I think, £200 on Frank's life, our furniture laid up in a warehouse, and my own faculties, such as they were, to make our living and pay off our burdens by." But with the courage of her hardy Scottish ancestors —she was born near Musselburgh, in 1828—she set herself to the task, and, often struggling with a heavy heart on account of the illnesses of her children, she plied her pen at story-telling and in writing for the journals. Mrs. Oliphant died at Wimbledon, June 25, 1897.

THE REAL NAME OUT OF WHICH "EDNA LYALL" WAS MADE

Only one more writer of note need be mentioned here. Edna Lyall, who was born at Brighton, in 1859, and died at Eastbourne, on February 8, 1903, was a woman novelist of real power and sincerity, whose many books, which were widely read and are still popular, have done good. Her real name was Ada Ellen Bayley, and the name under which she wrote was made from it.

Of course, there were many other women story-tellers whose books were popular, more or less, and there are many others still alive who enjoy fame as great as some of those of whom we have read here; but those we have chosen may fairly be described as the most noteworthy of the English women writers up to the end of last century.

The photos of Mrs. Linton and Miss Yonge on page 2681 are by Elliott & Fry; those of Mrs. Craik and Mrs. Oliphant by Mendelssohn

THE NEXT STORIES OF MEN AND WOMEN BEGIN ON PAGE 2711.

ROBIN HOOD AND HIS MEN STORM A CASTLE



Wonderfully courageous were the merry men of the greenwood under their valiant leader, Robin Hood. Here we see them attacking a castle, effecting an entrance over some tree-trunks thrown across the moat.



Robin Hood's charity



Robin Hood as a potter



Robin Hood as a beggar

ROBIN HOOD AND HIS MERRY MEN

CONTINUED FROM 2404

ONE day, when Richard Cœur de Lion was King of England, there walked in the beautiful green forest of Sherwood a handsome youth and a beautiful maid who were lovers plighted to be wed. The youth was Robert, son of the Earl of Huntingdon; the maid was Marian, daughter of the Earl of Fitzwalter. They both loved the greenwood; they both shot exceedingly well with the bow; and the maid was as swift to mount and ride a horse as was the handsome youth at her side. As they walked hand in hand down the green glades of the forest, Robert spoke of the merry days that lay before them, and Marian laughed to think of the great joy that was coming to her. They were happy lovers, a boy and a girl who thought of life as a delightful summer ballad.

But a terrible thing happened. The King was in Palestine, and his wretched brother, John Lackland, ruled the kingdom. He oppressed those who opposed him, and among those whom he ruined was the Earl of Huntingdon. Poor, brave, happy Robert saw in a single day his father killed, his home destroyed, his estates seized, and himself made a homeless and beggared outlaw.

He escaped from the soldiers of John, and, plunging into the thick forest of Sherwood, with his bow, threw himself down upon the green earth and wept for the ruin that had so suddenly overtaken him.

When morning came, he took counsel with himself and planned how he should live his life. The night in the open air had been sweet to him; the sunrise breaking and glittering through the fragrant branches had roused him in the first flush of dawn; he drew the scented cool air into his lungs, felt the glory of the day caress him, and saw that the greenwood was a fair world.

"Since John has made an outlaw of me," he said, "I shall take this good forest for my estate. I shall feed upon the King's venison, and call myself Robin of Sherwood."

He wrote a sad letter to Maid Marian telling her of all his misfortunes, and setting her free of her vow, since he could not ask a great lady to share his outlaw's life in the forest. It cost him many a sigh to send this letter. It was hard for him to give up his happiness, and he felt sad and lonely in the depths of the great deep wood. But his solitude was soon broken.

Brave men who had served his father, the Earl, came into the forest

with their bows and arrows and swore that they would spend their days with Robin. They refused to live under the Normans; they would be outlaws, they said—free, merry men of the greenwood, and Robin should be their king. And they lived in the forest near Nottingham, which Robin sometimes visited disguised as a beggar or tradesman.

Thus it happened that Robin became the chief of a band of stout English, who feared no danger, courted adventure like a maid, and loved a jest. This company soon arranged how they should live. In those days, when roads were hard to find, people traveled on horseback, and many a plump abbot and covetous merchant went by the forest with their saddle-bags stuffed with gold. Robin declared that he saw no wrong in relieving these people of their baggage, since they only lived to rob the poor; he would treat them with kindness, he said, but he would help himself to their money. Disguised as a friar one day, for instance, he despoiled two fat monks of their money-bags, and kept them on their knees praying for two hours. As for the poor and needy, no man of his must lay a finger upon them; nay, out of the spoil wrung from the rich they must help these poor and make them glad and happy.



"You shall be sworn," said bold Robin Hood,
"Upon this holy grass,
That you will never tell lies again,
Which way soever you pass."

Once Robin played an amusing trick on a tinker who said he had the King's warrant to arrest the famous outlaw. Robin told him he would find him in Nottingham, and offered to help him. When they came to the town he gave him so much ale that he fell asleep, and Robin walked off and left the tinker to pay the bill.

In this way Robin lived cheerfully. His fame spread through all the country. People whom he stopped and robbed told strange stories of how they had been carried far into the forest, treated to a feast worthy of a king, used with all courtesy and kindness, and after having "paid for the entertainment" had been pleasantly led forth and set upon their road again.

They told how Robin had dressed all his men in suits of Lincoln green; and how these cheerful fellows sang the old English ballads, and made great sport with the bow; and how one of their members called Little John was seven feet tall, another a very small and squat man named Much, and a jovial, fat priest of the Church named Friar Tuck, and how Robert was called not Robin of Sherwood, but Robin Hood, and was like a king among his merry men. No wonder that, as these stories spread about the world, the Sheriff of Nottingham felt that he must catch Master Robin and hang him for a rascally outlaw not fit to live.

The outlaws, however, ran great risks, and Little John even became a servant in the house of the Sheriff himself, where he played several tricks on a greedy old butler, finally knocking him over and running off to the forest with the silver plate of the Sheriff. Some time after the outlaws ventured into the town again to compete in an archery contest held by the Sheriff for a silver arrow. Robin won the prize, but the Sheriff tried to arrest him, and in the strife that ensued Little John was wounded, and the outlaws escaped only with great difficulty, little Much bearing big Little John for some distance on his back.

As Robin rode through the forest one day he came upon a young knight, and challenged him. They fought together and the knight was wounded. Then Robin, like a true man, knelt beside him to give him aid, but when the poor youth removed his helmet, lo, it was no knight! It was Maid Marian. Robin cried out with grief for having wounded her; but when he saw that the wound was not deep, and learned that Marian had come in search of him, he was glad, and embracing her most tenderly, he led her to the Trysting Tree. Here he blew upon his horn; his men came from every part of the forest, and when they had heard the story they offered obedience to Maid Marian as their queen, and the jolly

old Friar Tuck came rolling up with his book under his arm and married Robin to Maid Marian there in the glades of the forest.

One day Robin stopped an unhappy youth named Allan-a-Dale, and learned that, after waiting long for the beautiful woman who loved him, her wretched, miserly old father had promised her in marriage to an ancient, hideous, but rich man, old enough to be her grandfather. The marriage was to take place on the morrow, and poor Allan-a-Dale was broken-hearted. Robin bade him cheer up, and on the morrow he set off for the church, with his merry men following behind, and in the midst of the ceremony stopped the Bishop of Hereford, who was reading the service, and, blowing upon his horn, summoned all his merry men, with Allan-a-Dale and Friar Tuck in their midst.



He gave the butler such a rap
His back nigh went in two,
Though he lived an hundred winters
The worse for it he would go.

"This bridegroom is too old," said Robin Hood; and then, addressing the bride he said, "Lady, look round and see if you cannot find one more to your choice."

Of course she chose Allan-a-Dale, and then and there Friar Tuck married them.

On another occasion Robin exchanged clothes with a potter, took his cartload of pots and sold them in the market place at Nottingham; and on yet another occasion he stopped a butcher who was riding with panniers of meat into the market, and, changing clothes with him, set out for the very town where the Sheriff lived who had sworn to lay him by the heels. The streets were crowded, and Robin amazed everybody by selling his best beef at only twopence a pound.



So while the tinker fell asleep,
Robin made haste away,
And left the tinker in the lurch
For the great shot to pay.

The Sheriff heard of this strange young butcher and his doings, and at the market feast seated him at his side.

"I shall get money out of such a simpleton," thought the Sheriff, who was a miser. Robin could scarcely help laughing to find himself sitting in the place of honor beside his great enemy. The Sheriff asked if Robin had a big farm.

"Hundreds of acres," answered Robin, smiling to himself.

"And much cattle?"

"Hundreds and hundreds of the finest horned cattle."

"Do not speak so loud," mumbled the cunning old Sheriff; "but tell me how much you would take for your acres and cattle!"

"Three hundred pounds," said Robin.

The Sheriff arranged to ride out very early next morning with this very silly young butcher. They rode on till they approached Sherwood Forest.

"A bad man lives here," said the Sheriff. "Do you think we shall meet him? Robin Hood is his name."

"Oh, I am sure we shall not!" answered Robin, laughing.

Just then a hundred head of good fat deer passed in front of them.

"There go my horned cattle," laughed Robin. "What do you think of them? Are they not good?"

The Sheriff rode back to Nottingham late that night with no farm, no horned cattle, and without the £300 ($1,500) which he had brought with him for their purchase from the simple butcher.

Another of Robin's enemies was the Bishop of Hereford, who had never forgiven Robin the matter of Allan-a-Dale's marriage. He came riding into Sher-



The butcher he answer'd jolly Robin,
" No matter where I dwell;
For a butcher I am, and to Nottingham
I am going, my flesh to sell."



Up he took him on his back,
And bare him well a mile,
Many a time he laid him down,
And shot another while.



One of his best arrows under his belt
At the friar he let fly;
The curtal friar, with his steel buckler,
Did put that arrow by.

wood Forest one bright summer day with a company of soldiers carrying money to a distant monastery. He hoped to capture Robin on his way, and carry him prisoner to the Sheriff of Nottingham. As luck would have it, Robin was straying alone about the forest that day, listening to the blackbirds and thrushes, and enjoying the sweet scents of briar rose, honeysuckle, and bracken.

Before he knew it, the Bishop's soldiers saw him, and charged down upon him. Robin took to his heels. He dodged behind trees, crept along ditches, and ran down the narrowest glades. The horses of the soldiers tripped and stumbled, throwing their riders to the ground. Robin ran hard till he reached the cottage of a poor woman. He changed clothes with her, and promised that if she remained still, and let the Bishop capture her, no harm of any kind whatever should befall her.

As soon as she knew that she could serve Robin Hood, and do a bad turn to the wicked Bishop, who oppressed the poor, the old woman was glad. So Robin hobbled off, and the soldiers took no notice of him; but they went to the cottage, captured the dame, in Robin's Lincoln green, and carried her away. Not very far had they gone, however, before Robin stood in their way with all his bowmen ranged on every side of them. The soldiers laid down their arms, and the Bishop had to deliver up all his treasure.

" It belongs to the Monastery of St. Mary," said the Bishop.

" Nay," answered Robin; " it belongs to the poor, from whom you have filched it, and to whom it shall now return."

Then he made the Bishop celebrate High Mass; and all his men praised God among the trees in the forest.

On one occasion Robin lent a poor knight a sum of £400 ($2,000) wherewith to pay a selfish abbot who had lent it to him. The knight arrived at the abbey only just in time, and found the abbot laughing and eating heartily in company with a justice of the peace whom he had invited to dine with him and arrange for the transfer of the knight's broad acres to the abbey.

The knight, to the abbot's disgust, paid up the four hundred pounds, upbraided him for his greed, and rode away home, blessing the kindness of Robin Hood.

A stout and long encounter, too, had Robin with giant Friar Christopher, of Fountains Abbey. He shot all his arrows at him, but the friar stopped them all with his shield, and they then fought hard with swords until they became great friends, and the friar went off

with Robin Hood and his merry men into the greenwood.

Such stories as these came to the ear of King Richard when he returned from the Holy Land, and he determined to see Robin Hood. But though he rode many times in Sherwood Forest he saw nothing of Robin or his merry men. He was then advised to put on the dress of a monk, and so disguised he traveled through the forest, and Robin seized him, though the King gave him a blow that sent him sprawling on the ground. The King was treated fairly, and given a feast, and in the midst of it he showed his ring to Robin, and said that, though a monk, he was a messenger of the King. At the name Robin and all his men stood up, uncovered, and cried with one voice: "God save King Richard!"

The King then disclosed himself, and Robin knelt and kissed his hand. So pleased was the King with this loyalty, and so struck was he by Robin's kindness, that he gave him a free pardon. Robin and his merry men followed the King to London, and there they feasted and had great cheer.

But when Richard died, and John succeeded to the throne, Robin and his merry men had to fly once more to the forest. They were not very sorry, for they loved the wild life of the greenwood, and they were not afraid of John while they had the familiar forest for a kingdom of their own.

The years passed, and Robin grew very ill, and when he watched the young men shoot he grew very sad at heart. He said he thought he would go and visit his relative, the Abbess of Kirkley, in Yorkshire. Little John, very grieved at his master's sickness, bore him thither. He wanted to be near his master and nurse him; but the Abbess would not hear of this, and bade him wait in the garden. Then she made a wound in Robin's arm to bleed him, but, instead of tightly bandaging the wound, this woman, who, in her heart, hated Robin for his robberies of monks and priors, loosely knotted the linen, and went out, locking the door behind her. So Robin lay alone bleeding to death, and the faithful Little John stayed in the garden of the abbey gazing up at his beloved master's window.

Twilight fell upon the garden. Presently three soft notes sounded faintly upon Robin's horn.

"He must be dying to blow so weakly!" cried Little John, and started up. He ran up the stairs, reached the door, burst it open, and rushed in to embrace his master.

"I am dying," said Robin, and swooned in his arms.



He took him to a board anon,
To a table round,
And then he shook out of a bag
Even four hundred pound.



And such a buffet he gave Robin,
To ground he went full near;
"I do avow to Heaven," said Robin,
"Thou are a stalwart frere"



Robin saw some young men shoot,
Full fair upon a day,
"Alas, alas!" said good Robin,
"My joy is gone away."

After a moment he roused himself. "Give me my good bow and an arrow," he said. He took the bow, and went to the window. "I will shoot once more," he said, "and where the arrow falls, there let me be buried."

He was so weak that the arrow fell but a little way into the ground.

"A good shot! A good shot!" cried Little John, with his eyes full of tears.

"Was it a good shot?" demanded Robin eagerly. "Really a good shot?"

"'Twas a good shot, master."

Then Robin said:

Lay me a green sod under my head,
And another at my feet,
And lay my bent bow by my side,
Which was my music sweet;
And make my grave of gravel and green,
Which is most right and meet.

Let me have length and breadth enough,
With a green sod at my head,
That they may say when I am dead,
Here lies bold Robin Hood.

As he lay swooning in the arms of Little John, he suddenly roused himself, and looked earnestly forth from the priory window towards the gathering darkness of the night.

"Was it," he whispered hoarsely, straining his eyes, while his heart throbbed and shook his frame, and his soul passed away—"was it a good shot?"

A PAIR OF MAGIC SLIPPERS

IN the old coaching days, when everybody traveled by road, the innkeepers were a race of busy men. Certainly, Sandro Reni, who kept an inn on the highway between Siena and Florence, was the busiest man in Italy. His inn was always crowded with travelers, and all the work fell on his shoulders. His wife died, leaving him a little daughter named Nina; and as he found that he could not get on without a helpmate, Sandro married again. Little help, however, did he get from his new wife. She was a very beautiful creature, but she was as idle and as vain as she was beautiful. And, unhappily, the fame of her great beauty spread far and wide, and this made her still idler and more vain. Whenever travelers came to the inn, she used to show herself off, and say:

"Have you ever seen anybody more beautiful than I?"

At first they replied that they had not; but at last, as Nina grew up, and became also very lovely, they said:

"Well, your little stepdaughter, you know, is undoubtedly a very charming girl."

By this time, however, the woman's head had been turned by all the admiration she had obtained, and she could not bear to hear praise given to anyone but herself. She looked with spiteful and angry eyes at Nina, and said to herself:

"If I do not get that child out of the way, I shall lose all my fame."

She had received a great many jewels from her admirers, and she now sold half of these, gave all the money to two wicked and desperate men, and told them to take Nina to a distant forest and kill her, and bury her there. The two men carried Nina to the forest; but they were so touched by her innocence and beauty that they had not the heart to shed her blood, so they tied her to a tree and left her to starve.

There Nina remained for five days and four nights, but on the fifth night, just as all her strength had failed, a band of robbers gathered beneath the tree to share their spoils.

"Oh, great heaven!" cried the captain of the robbers, as the light of their fire fell upon the white dress of Nina. "An angel is watching us!"

The robbers fell upon their faces. Then, finding that the white figure did not move, the captain crept slowly up, and touched it.

"Why, it is a beautiful girl," he exclaimed. "Quick, cut the ropes! She is dying!"

The robbers took Nina to their cave, and kindly tended her, and when she recovered she told them her story.

"Well," said the captain of the robbers, "I think that it would not be wise for you to return home. Your stepmother would find some other way

to kill you. Stay with us, and be our little housekeeper."

And this was what Nina did. She kept house for the robbers in the cave, and prepared their meals for them. In return they treated her as a little sister, and whenever they went to sell their spoils at Florence or Siena, they brought her jewels and fine dresses. But one day they stopped at Reni's inn, and his wife saw one of the dresses.

"Who is that for?" she said.

"For someone more beautiful than you," said the captain of the robbers.

The stepmother at once guessed who it was. She sold the other half of her jewels, and gave all the money to a witch, and got a pair of satin slippers from her. And the next time the captain of the robbers came, she said to him:

"Here's a pretty present for the pretty girl of whom you spoke."

The captain of the robbers took the slippers to Nina, and in the afternoon, when Nina was alone, she put them on. When the robbers came home at night, they found their little sister lying dead on the floor of the cave, and they could not understand how she had come by her death.

"Oh, how beautiful she is!" said the captain of the robbers. "Let us array her like a princess and make the cave her tomb."

So they made a couch in the middle of the cave, and placed Nina upon it, dressed in her jewels and a lovely robe, and they all went sadly away, and dwelt in another part of the forest.

Finding that the place was no longer infested with robbers, huntsmen in search of wild game began to come there, and one day the young Duke of Tuscany started a boar, which ran into the cave.

"Now I have the beast," he said. And he alighted from his horse, and entered the cave, and found Nina lying on the couch.

"Oh, what a miracle of beauty!" he exclaimed. "Surely she lives!"

But though he tried many ways to bring her back to life, she never moved, and at last, as night was falling, he prepared to leave.

"But I must have a keepsake," he said to himself.

He pulled off one of her slippers. Then, seeing in amazement that one of her eyes had opened, he pulled off the other slipper, and the other eye opened, and Nina rose up. In great joy, the young duke clasped her in his arms, carried her to his horse, and seating her on it, led her to his palace.



Nina opened her eyes and rose up, and the young duke clasped her in great joy.

After he heard her story, he had the stepmother and the witch and the two wicked men punished. But he pardoned the robbers, and took them into his service; and when the splendid wedding of the young duke and the lovely Nina took place, Sandro Reni became quite an important man in that country as father of the duchess.

THE FAIRIES OF ST. DAVID

A LONG time ago, Elidorus, a boy of twelve years of age, was punished by his schoolmaster, and he ran away and hid in a cave by the river, and there he remained without food for two days. Two wee men then appeared, and said :

" Follow us, and we will take you to the Land of Delight."

And Elidorus followed them through a dark passage down the earth, out into a rich and beautiful country. But there was no sun or moon or star there, only a strange twilight falling from a strange sky. The two wee men led Elidorus to their King, and their King made Elidorus the companion to his eldest son. All the people of the Twilight Land were very small, but they were very handsome, and they had long golden hair that fell over their shoulders. The King of the Twilight Land allowed Elidorus to go back through the dark passage and visit his mother, and one day Elidorus was telling her what a rich country he lived in, and she bade him bring her some of its treasures.

So, the next time Elidorus played with the son of the King, he stole a golden ball and ran with it to his mother's house. The two wee men, however, pursued him, and they tripped him up just as he got indoors, seized the golden ball from his hand, and departed.

Elidorus was very sorry that he had stolen the golden ball, and he wanted to beg the King's pardon, but the passage in the cave by the riverside was closed, and was never opened again to Elidorus.

THE LORD OF THE LIONS

SOME time ago a settler in Uganda brought with him a donkey, and one morning the donkey ran away into the open country. There he brayed so long and loudly that he roused a lion. The lion sprang up, and then stood still in astonishment. Was it safe to attack this strange, new animal with long ears ?

" Who are you ? " he said.

" The Lord of the Lions," said the donkey. " Didn't you hear my challenge ? "

" Yes," said the lion. " But we need not fight. Let us enter into a league against all other animals."

So the two of them set out together, and they came to a river. The lion cleared it at a leap, but the donkey swam through it very badly.

" Why, you can't even swim ! " said the lion.

" Swim ? " said the donkey. " I swim like a duck. Didn't you see I caught an enormous fish with my tail, that nearly pulled me under ? But you were so impatient that I let it go."

Soon afterwards they came to a wall. The lion jumped over, but the donkey got his fore feet across and couldn't get any further.

" What are you doing now ? " said the lion.

" Can't you see ? " said the donkey. " I'm weighing myself. I want to find out if the fore part of my body is as heavy as the hind part."

After a wild struggle the donkey got over, and the lion said :

" You've no strength at all. I shall fight you."

" Just as you please," said the donkey. " But let us first have a real trial of strength. When I'm by myself I never jump over a wall, I knock it down. Let me see you do that."

The lion began to pound away at the wall with his paws, but he bruised himself so badly that he had to stop. The donkey then kicked the stones furiously with his iron hoofs, and the old wall soon tumbled down.

" By jingo, you are strong ! " said his companion, licking his wounded paws. " I will have you acclaimed Lord of the Lions."

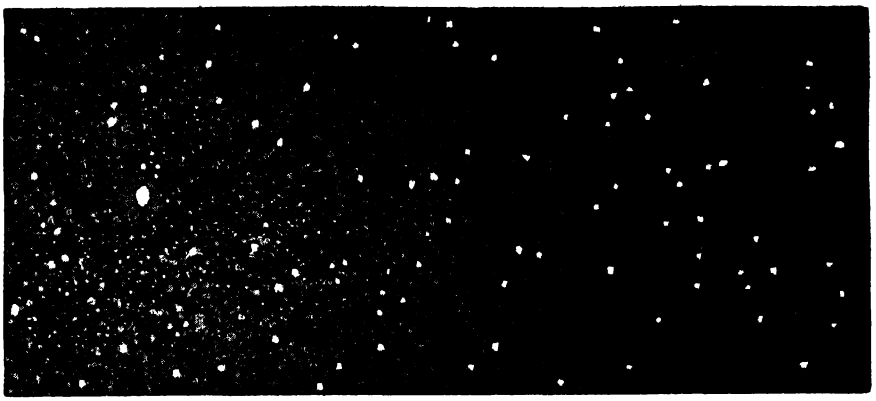
The next day all the lions of Uganda met together, and the donkey led them with a majestic air into a valley overgrown with great prickly thistles.

" Oh, don't go there, please ! " all the lions cried in terror. " The prickles will get into our paws."

" Well, you are timid creatures ! " said the donkey. " Now, look at me."

And, to the amazement of the assembly, he began to eat up the prickly plants. He was at once acclaimed Lord of the Lions, and as he never wanted any of the game which his subjects killed for food, he pleased them more than any other ruler they had ever had.

THE NEXT STORIES BEGIN ON PAGE 2749



THE STARS AS WE SEE THEM

CONTINUED FROM 2547

WE already know that the sun is one of the stars, which means that the stars are suns. This was seen by Giordano Bruno long before it could be proved as it can now. At the present time the most promising part of astronomy is based on this mighty truth, and one of the greatest observatories in the world—it is in America—is devoted to studying the sun as one of the stars, and to studying the stars as suns. Everything we learn now about the stars helps us to understand the sun—our star; and everything we learn about the sun helps us to understand the other stars.

But we must begin at the beginning. We know that the beginning of the study of the stars was very long ago, ages even before the invention of the telescope or any kind of instrument, when men had only a pair of eyes and a good brain behind them. The Assyrians and Egyptians, the Chaldeans and the Greeks, had no telescopes and few observatories, but they learned practically everything that was known about the stars until almost our own times. For, after all, anyone with eyes, who cares to use his eyes, can study the stars and learn a great deal about them.

The first thing men learned was that a few of the bright points in the sky, like stars, move about or wander among the other stars. These wanderers, or planets, we now understand; and we keep the name "stars" for all the rest, which for many ages were called the *fixed* stars, in order to distinguish them from the *wandering* stars. There are good reasons why we should drop the word *fixed*. It is not necessary, as we can call the wandering stars *planets*, and not stars at all; and it is not true, for we know that many of the "fixed" stars move, and we have reason to believe that they are all of them moving.

If we watch these stars, however, every clear night for the whole span of our lives, we notice no movement; and this is true of most of them, even though they are watched for generations or centuries. They seem to keep the same positions compared with one another, though the whole sky seems to have moved at different times of the year or at different times of the night. The winter sky, for instance, seen from our part of the world, is much more interesting than the summer sky.

Thus it happens that men's eyes naturally came to group the stars together, and these groups, we know, are called constellations. From night to night, or year to year, the stars making up a constellation remain in the same positions beside one another;

and so, if six form a sort of coronet, men call them the crown, and so on. The proper name for these six is the Northern Crown or Corona Borealis, and you can find it in the picture on page 2641—or, much better, in the sky. Borealis is derived from Boreas, the god who was supposed to blow the north wind. But it is most important for us to understand now what could not be understood long ago.

HOW MEN THOUGHT THEY WERE LIVING IN A BALL, WITH THE STARS STUCK ON IT

When we look at the sky it seems to be a sort of dome or bowl upside down —someone has called it "that inverted bowl we call the sky"—with all the stars stuck on it, at the same level or distance from our eyes; so that what we *see* as a group of stars would really *be* a group of stars, or a constellation. And astronomers actually thought that the stars were attached to a mighty sphere, inside of which we were, and that the movements of the sky as a whole were due to this great sphere or hollow ball moving round and carrying all the stars together with it. The planets, moving separately, had to have other supposed spheres or bowls invented for them, and we may guess how complicated and impossible the whole thing grew, for it was wrong from the first. It is as if you looked across your room and thought that everything was on the same level—at the same distance from your eye. A funny notion you would have of what your room really is! But actually you see the room *in perspective*, and you know that things which lie side by side in your field of view may be, one quite near and the other at the far end of the room.

THE IMMENSE DEPTHS IN THE SKY THAT WE CANNOT REALIZE

Unfortunately, we cannot see the sky in perspective. If we could—if we could get any notion at all with our eyes of the *depths* of space—much more than half of all the mistakes of astronomers could never have been made. Any boy could have corrected them the first time he was out on a fine night. Quite lately a clever Englishman has invented a way of giving us some idea of sky-perspective, or the depths of space. He has made pictures of the sky in the same way that things on the earth can be photographed as they are seen, first through one eye and then through the other. When looked at with both eyes through a stereoscope, or "solid see-er," these pictures give us a perspective of the sky, and we can see some stars as comparatively near, and others—which look just beside them in the sky—as shining through to us from the far depths of space. So now, perhaps, we shall understand, once and for all, that the constellations, or groups of stars, look as they do just because we see the sky on the flat, our eyes being unable to give us any idea of the tremendous depths through which the light of different stars is coming to our eyes.

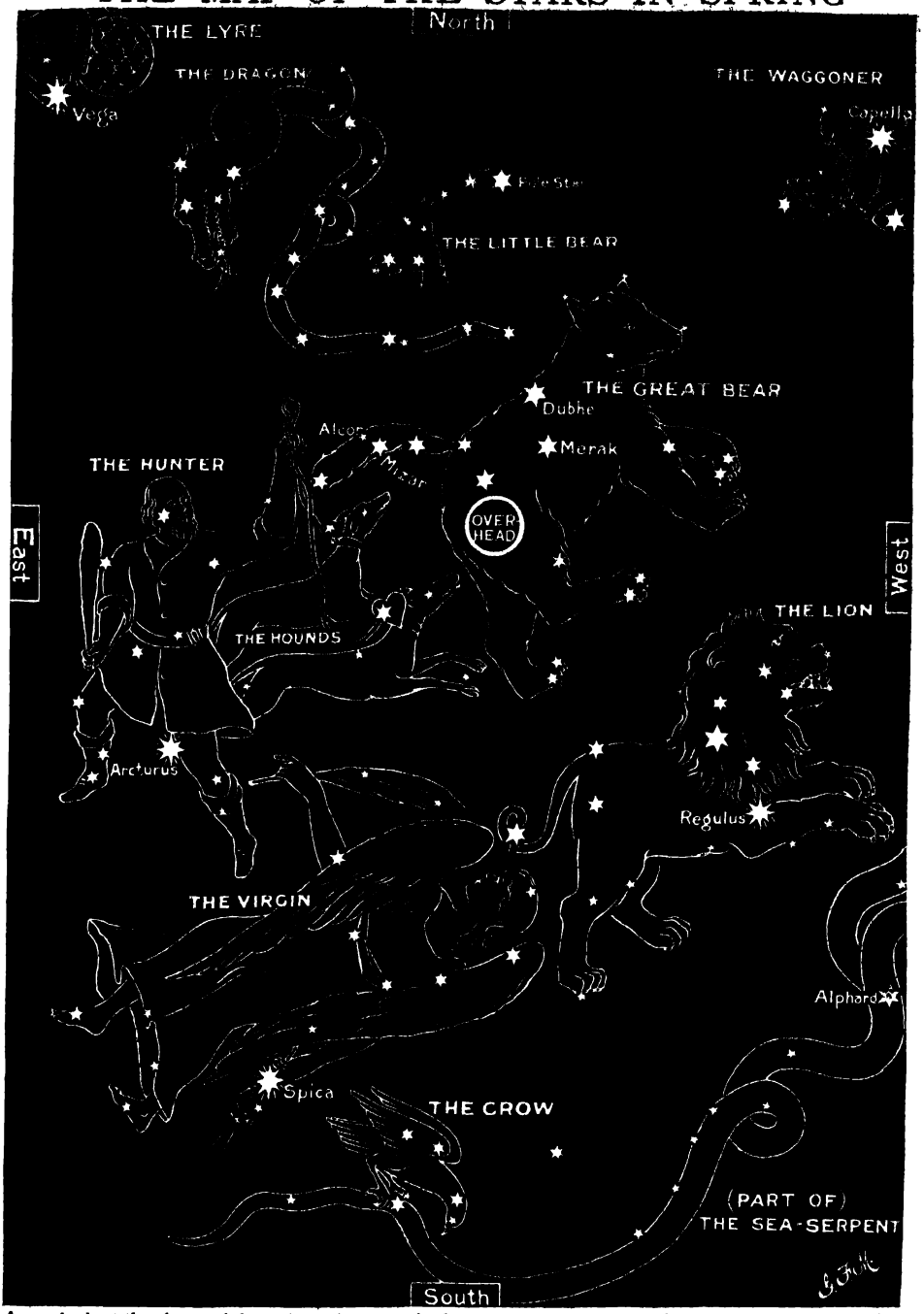
Nevertheless, of course we must learn the principal constellations, for they are the landmarks of the sky—or sky-marks, if you like—and they are always referred to when we want to say where to find a comet or a planet at any particular time. And here we may learn a very interesting thing. The "fixed" stars are not fixed, and therefore, as they move, the constellations ought to change. And so they do. The first astonishing fact about these changes is that, on the whole, they are so slight. We have names and records going back for ages; but, in general, the face of the sky is very much what it was when the study of the stars began.

THE CHANGES THAT TAKE PLACE SO FAR AWAY THAT WE CANNOT SEE THEM

Yet we now know that many of these stars are moving perhaps ten or even a hundred miles every second. This can only mean that the distances of the stars are enormous; for, of course, the nearer things are to our eyes, the greater is the visible effect of their movement, and vice versâ.

But the second fact is that, though the changes seem so small, considering how long the stars have been watched by mankind, yet there are changes. For one thing, we know certain constellations, or groups of stars, which the ancients did not name, and which have received names near our own time. Knowing how carefully the old astronomers watched, and how ready they were to give names, we may reasonably believe that the reason why they took no notice of these "new" constellations, as they are called, is that they were not there to be seen. The stars making them have moved in the sky, and the

THE MAP OF THE STARS IN SPRING



As we look at the sky at night and see the stars shining, we notice that most of them are clustered together in groups. These groups are called constellations, a word that means "stars together." Some constellations have curious names, because the people of ancient times named them after their gods, or after things which the stars were thought to resemble. As we look at these groups, it is impossible for us to see any resemblance to the things, but some modern astronomers suggest that perhaps the positions of many of the stars, as seen from the earth, have changed during the centuries, and that the groups did at one time resemble the creatures named. In these maps we see the outlines of the constellations as ancient people drew them.

To read these star-maps, stand facing the south and hold the map above the head with the top pointing north.

"new" constellations are therefore really new in the sense that, a few thousand years ago, the stars making them did not look like a group of stars, or a constellation, to the eye, as they do now.

Some of the names given to the constellations, suggesting that they look like things we know, may seem very absurd. Here, too, the fact that the stars are not really fixed may help to explain. It may be that, when the name was given, the stars were in positions that made the constellations look more like their names than some of them do now.

THE NORTHERN AND THE SOUTHERN HALVES OF THE SKY

If we consider how the earth turns in space, we shall understand that only the northern half or so of the sky can ever be seen from most of the United States. As it happens, this includes the more interesting and wonderful stars, though perhaps we may think so only because the great astronomers have all lived on the northern half of the earth, and there is only one first-class observatory—that of Cape Colony—on the southern half of the earth yet; so that we really do not know nearly so much as we should about the southern sky.

But everyone who lives in our part of the world should know, at any rate, a few of the finest constellations and stars that we can see without the use of any machinery except that by which the Greeks made such great discoveries in astronomy—a pair of eyes and a mind. The pictures show us what we really ought to know, and I shall here mention the principal stars that are shown. But the pictures do not show one thing which would interfere with their clearness, and that is the northern half of the Milky Way, the great belt of stars which runs right across the entire sky, all the way round.

THE QUEER NAMES THE ANCIENT ASTRONOMERS GAVE TO THE STARS

We all should know the seven stars that form the tail and part of the body of the Great Bear. These seven stars look very like a dipper, and are often called the Dipper. When we see them we can always find the Pole Star, by following up the line made by the "pointers," Dubhe and Merak. Look straight at the Pole Star and that is the *north*. Now go back to the Great Bear, and follow the course of his tail downwards and backwards, until you come to the magnificent star Arcturus. This is one of the brightest stars, which are called "first magnitude" stars. *Magnitude* is Latin for bigness. Arcturus is one of the most rapidly moving of all the flying stars, and is believed to travel about one hundred miles every second.

Another easily-seen constellation looks very like a big W, ⁘, in the sky, and is called Cassiopeia, the lady in the chair. It can never be mistaken.

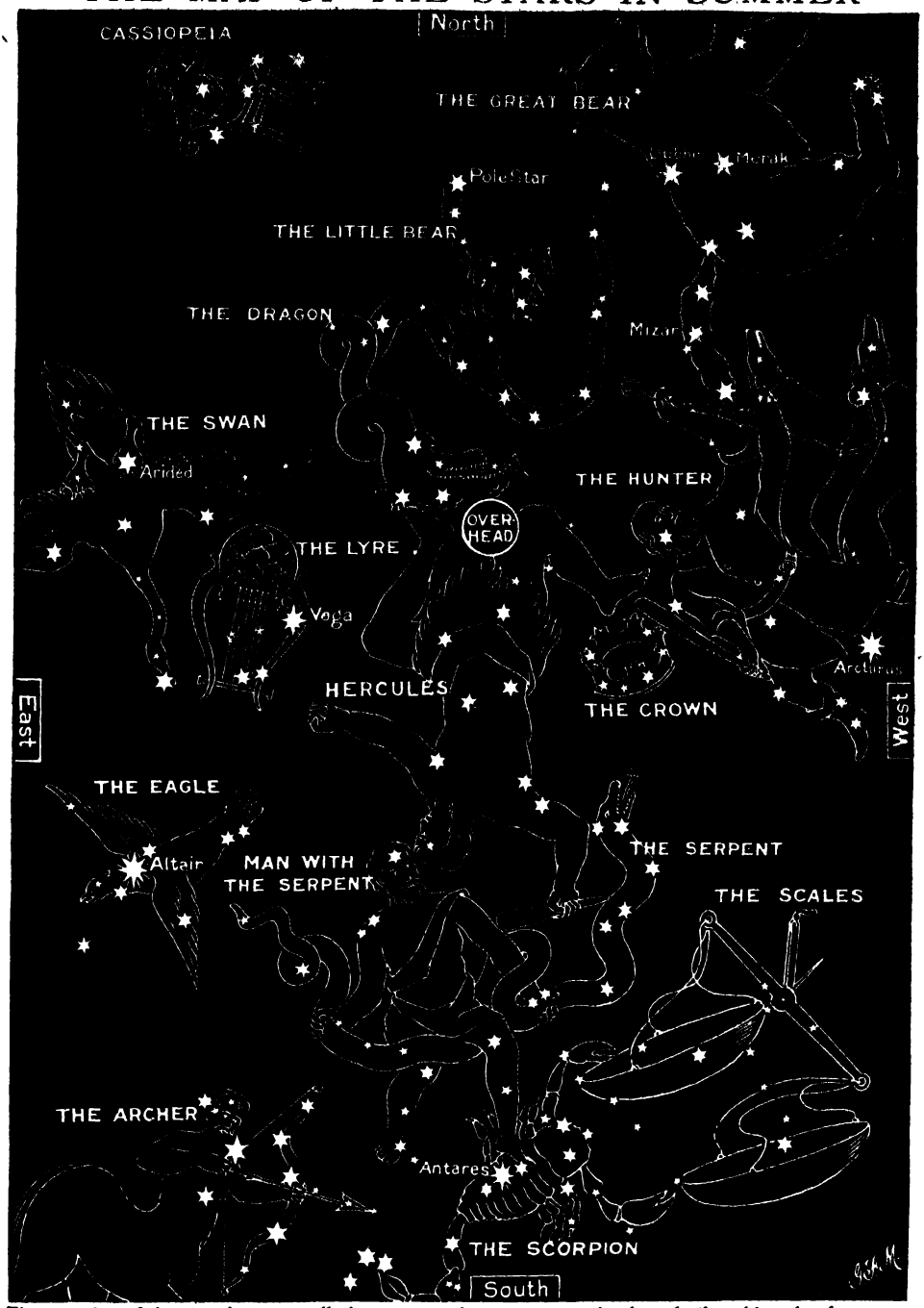
A beautiful white star of the first magnitude is Vega, in the Lyre, lying beside the Milky Way. It is specially interesting, not merely because it is one of the most beautiful stars in the sky, but because careful study shows that it is in the direction of this star that the sun, and we with him, are now moving, at the rate of about twelve miles in every second of time.

Quite near to Cassiopeia is Perseus. This can often be seen as a great L below the great W, and it is interesting because one of its stars is the celebrated double star Algol, which is really two stars, one bright and the other dark. They revolve round one another, so that every few days the dark one partly eclipses the bright one, and so Algol gets brighter and less bright every few days from age to age.

THE FINE SPECTACLE WE CAN SEE IN THE SKY ON A FEBRUARY NIGHT

The map on page 2645 shows the magnificent spectacle that we may see—and should look for—any fine evening in February and thereabouts. Below the L of Perseus, not to the left like Capella, but to the right, and lower than Capella, are the Pleiades. There is nothing in the sky like this wonderful group of stars. It is a true constellation, for the stars which make it are really together. With the unaided eye we can see seven if we are fortunate; with a glass we can see many more. With a telescope and a camera we can print the images of about thirty thousand stars in this mighty group: stars and nebulæ too. In no other part of the sky is there such a tremendous amount of matter gathered together as in the Pleiades. Now run your eye down, and to the left from the Pleiades,

THE MAP OF THE STARS IN SUMMER



The grouping of the stars into constellations supposed to represent animals and other things has been continued by modern astronomers because it has proved convenient, and any change now would cause confusion. One of the names for a group of stars, the Dipper, is a good and useful one, because the seven bright stars that form the tail and back of the Great Bear, as seen in this picture, really have the shape of a dipper, and we can easily find it in the sky. Of course, after giving them names, the ancients built up many fairy tales round the constellations, which professed to tell how the stars came to be there, and some of these stories will be found in other parts of this book. The Great Bear is the most easily seen of all the constellations, and two of its stars point almost in a straight line to the Pole Star, which is always to the north of us.

and you come to the wonderful red star of the first magnitude called Aldebaran. Go on in the same line, and you reach the greatest and most splendid of the constellations, Orion. The map clearly shows how the stars of Orion make the figure of a great huntsman, with three fine stars in his belt, and three smaller ones forming the blade of his dagger. The middle one of these three last is really the most wonderful thing in the sky—it is not a star, but the Great Nebula of Orion, out of which at least six fine stars have already been formed, and doubtless many more will be formed throughout the countless ages to come. Now look downwards and to the left from Orion, and you will see Sirius, the brightest star in the whole sky—"the leader of the heavenly host." We must not suppose, however, that, if we could see all the stars in a line at equal distances from our eyes, Sirius would be the biggest. Sirius, like Algol and thousands of other stars, is really a double star. Its companion is dark, but never gets between Sirius and us, so that the brightness of Sirius does not change.

THE WONDERFUL SIGHT YOU CAN SEE ABOUT BEDTIME

Now we have come down the right side of this map, which really shows us all the greatest glories of the sky, but there are three splendid stars in it still which must be mentioned, and can easily be recognized. These are Castor and Pollux, in the heads of the twins or Gemini, and Procyon in the Little Dog.

If you learn these few stars, and look out for them when there is a chance, they will be easily remembered, and will always make the sky on a fine night vastly more interesting than it would otherwise be. And the fact that you must go to bed early does not matter, for nearly all of them are visible at just about children's bedtime, or not much after.

We might think at first that there was nothing to find out about the brightness of the stars. Anyone with eyes in his head can see that Sirius is brighter than Arcturus, and that Arcturus is brighter than any of the stars in the Pleiades. Also it is not difficult to think of ways of measuring these differences. For instance, we may compare the length of time it takes for various stars to print an image of themselves on a particular kind of photographic plate. If we assume—though we really may not—that the light of all the stars is the same in quality, so far as its affecting a photographic plate is concerned, then we have here a means of measuring the comparative brightness of the stars.

WHY WE CANNOT UNDERSTAND THE REAL BRIGHTNESS OF THE STARS

But, when we come to think of it, we shall see that neither by this method, nor by the simple use of our eyes, nor by any other means of the kind, can we ever learn what is the brightness of the stars. We can learn how bright they appear to us, we can learn the comparative intensity of the light from them when it reaches us; but that is a very different thing. The little moon, shining by reflected sunlight, is vastly brighter than Sirius, which is probably far brighter, really, than a hundred suns. The distance makes this difference, just as it does in the lighthouses in the picture on page 2535.

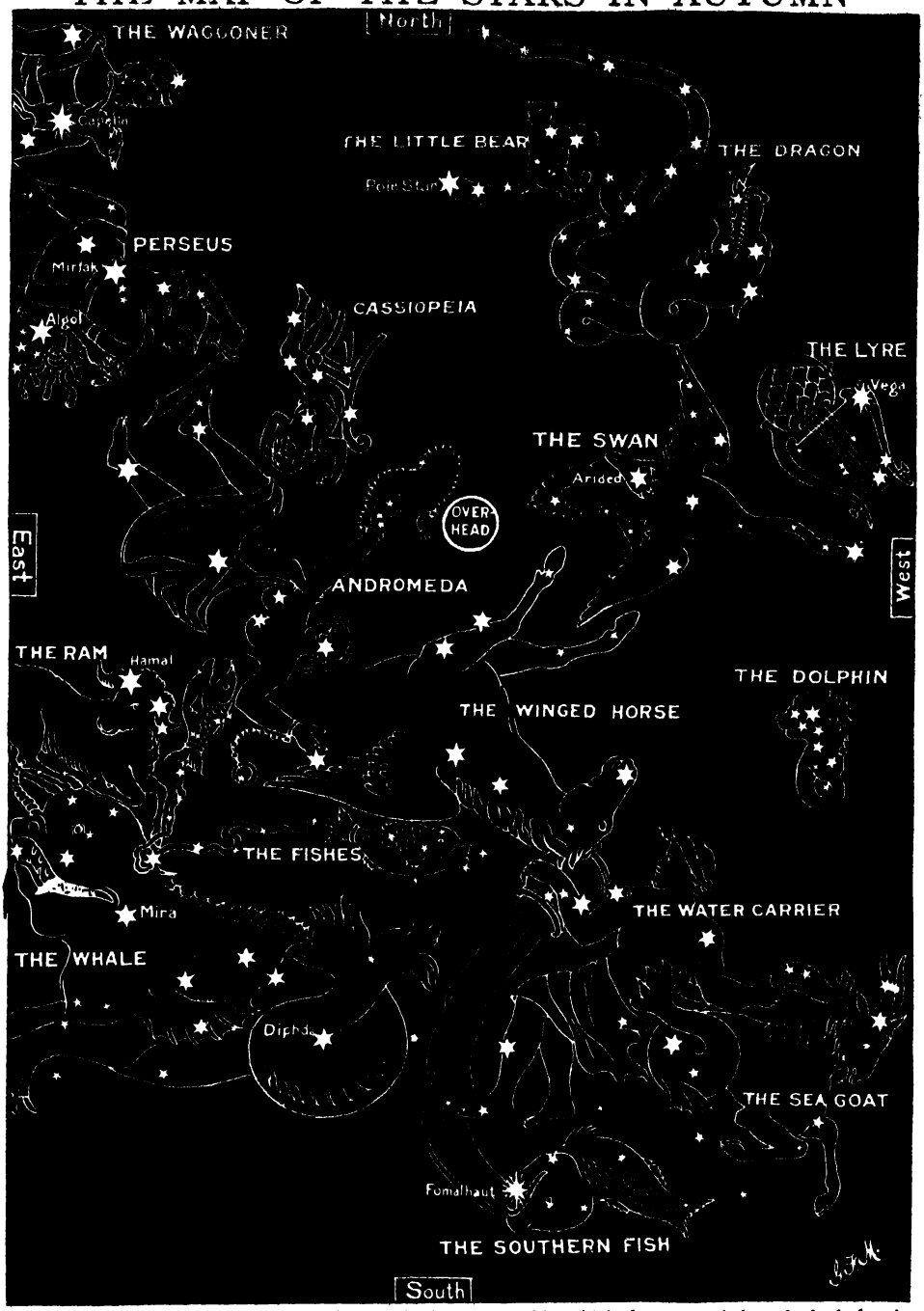
What we can see and learn, then, by these means, is only the *apparent brightness* of the stars. Yet the star that seems to us the brightest in the sky, which is Sirius, might be really the faintest, and might shine brightly only because it happened to be much nearer than any of the others. Therefore, we can only learn anything about the *real* brightness of the stars by taking into account their distance.

Their distance is the first great problem of the stars. All over the world astronomers are working at it, and now we do know the distances, in a very general way, of a fair number of stars. This is how they are found.

HOW MEN FOUND OUT THE DISTANCE OF THE STARS

If a thing is very near your head, and you change the position of your head, the apparent position of the thing changes. Even if you look at it first out of one eye, and then out of the other, its apparent position changes; and if you know the distance between your two eyes, you can in this way measure the distance of the thing at which you look. Now, in the case of a thing like the moon, or a planet, we can change our position of sight by simply noticing where it appears to be when seen first from one part of the earth, and then from another, perhaps hundreds of

THE MAP OF THE STARS IN AUTUMN



We have all heard of the Zodiac, the belt in the heavens within which the sun and the principal planets move. The best-known constellations are those which lie within the Zodiac. They are twelve in number, and some of us have learned a little rhyme to help us to remember their names. It begins like this: "The Ram, the Bull, the Heavenly Twins; and next the Crab, the Lion shines, the Virgin and the Scales." The other groups in the Zodiac are the Scorpion, the Archer, the Goat, the Water Carrier, and the Fishes. We can see all the constellations of the Zodiac in these four star-maps, and can then find them in the sky. These names were given at least 2,500 years ago, and it is said that the Ram and the Archer were the first two constellations to be marked out and named. Many other constellations have been named in more recent times.

miles away. This base-line of a few hundreds of miles is quite enough in such cases, just as the base-line no longer than the distance between your two eyes is enough for a pencil held in front of you. But the stars, even the nearest of them, are so far away that any base-line taken on our little earth is far too short.

What, then, can we do, for we cannot leave the earth? We can use the movement of the earth round the sun. We can look at the star on a certain night, and then look at it again six months later, when the earth is on the other side of the sun. This gives us a base-line about 186,000,000 of miles long—twice the earth's distance from the sun—and that is just long enough to allow us to notice a measurable difference in the apparent position of some stars, and so we can measure their distance. But there are many cases in which we notice *no difference* even when we use this tremendous base-line. Such stars are unimaginable distances away.

How men can tell the "weight" of stars that are out of sight

It is sometimes said that we can weigh the stars, but weight is not the right word to use here. By the weight of a thing, such as this book, we mean simply the amount of pull due to gravitation between it and the earth. If the earth were suddenly to become nothing, the book would lose nearly all its weight, and have left only that due to the pull of the sun. But the amount of stuff in the book would be, of course, the same as before. This amount of stuff we call its *mass*, and it is the mass of the stars that we can measure, or at least try to measure. Their "weight" means nothing, though if we know their mass we can say what their weight or gravitation pull would be at the surface of the earth.

We can measure the mass of a star sometimes when it has another star near it, for we can notice how its movement is affected. For instance, we know an almost endless number of double stars in the heavens—a pair of stars revolving round each other. They move in accordance with their gravitation pull for each other, and that depends on their mass, so that we can measure it. Thus we can even measure the mass of stars we cannot see, which is, I think, a great triumph for astronomy.

The size of the stars is a thing we cannot find out in any direct way, and at best we can only make a guess at it. The reason is that by no possible means at our disposal can we see the disk of a star, so as to measure its diameter—that is, its size across. As no telescope shows this, and as our study of the light from a star tells nothing about its size, it is not easy to see a way in which its size can be measured with certainty.

How men try to find out the size of the stars

But we are not completely baffled, for if we can learn certain other facts about a star, then we can at least *guess* its probable size. If, for instance, we know its distance, if we know its brightness, and, still more, if we know the amount of stuff in it, then we shall not be far from being able to guess what its probable size must be. But these things are very difficult to find, and the results are not very certain or precise; so the most we can say is that probably this star, or that, must be so many times as big as the sun—and that is usually the case—since it gives out so much more light.

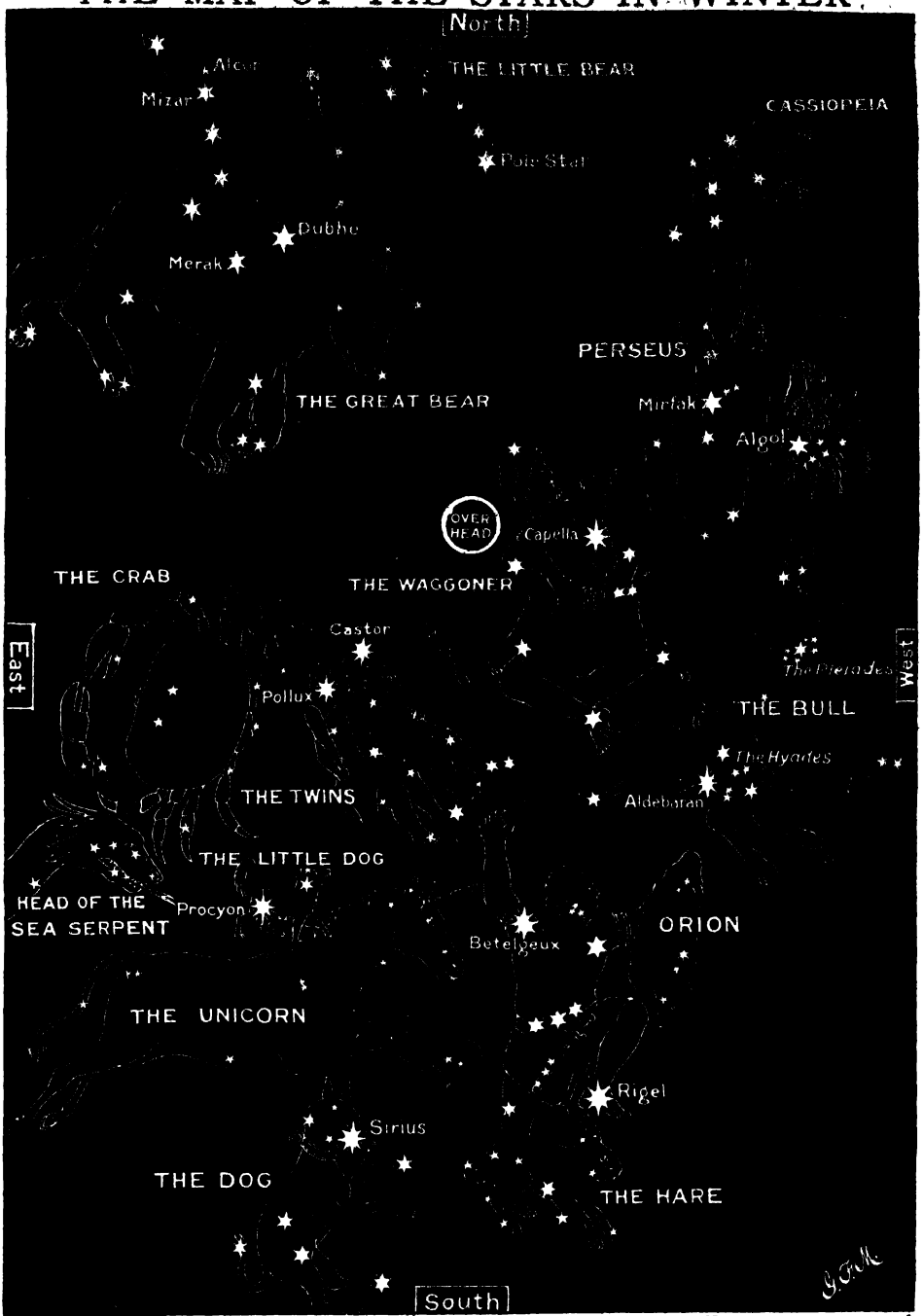
The last point about the stars which we must mention here is their number. To find this, we need more than the eye helped by the largest telescope. We must use a photographic plate, which can see more stars than the eye, simply because the substances in the plate are more readily affected by the light of the stars than are the substances in the screen or retina of the human eye. The number of stars thus to be found is about one hundred millions. This, of course, is a very large number, but it is, after all, not much more than the human population of the United States of America.

How many stars are there in the sky?

Also we do *not* find that, with improved telescopes and cameras, the number of the stars increases, as we should expect it to do if their number were really endless. On the contrary, we have good reason to believe that there is a limit to the number of the visible stars, and therefore, probably, of the dark and invisible stars. Our universe of stars probably has a boundary; but there may be an infinite number of other universes in other parts of space.

THE NEXT PART OF THIS IS ON PAGE 2737.

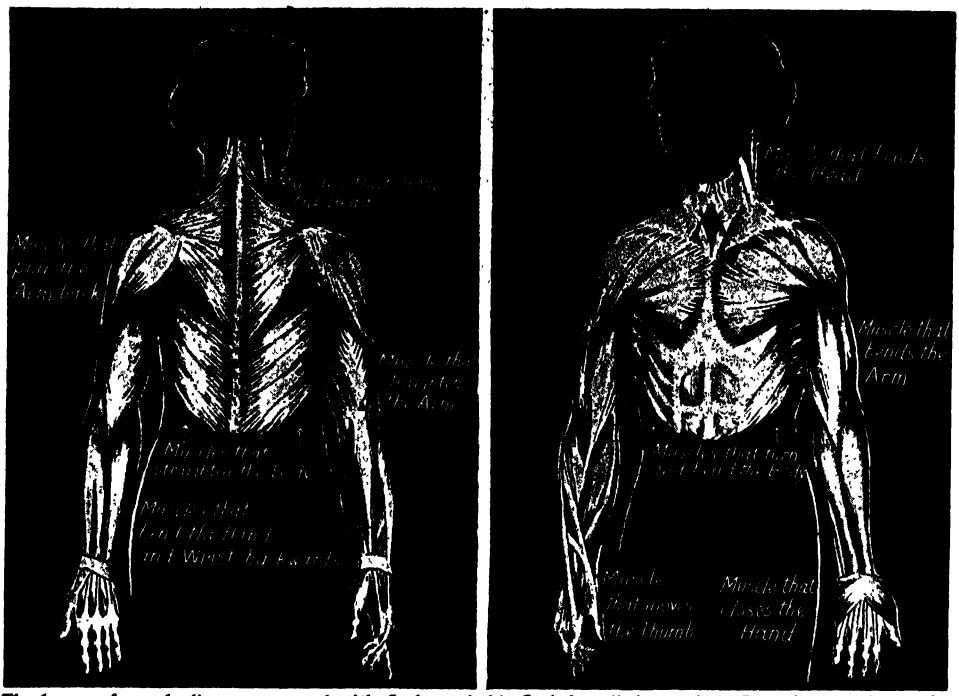
THE MAP OF THE STARS IN WINTER



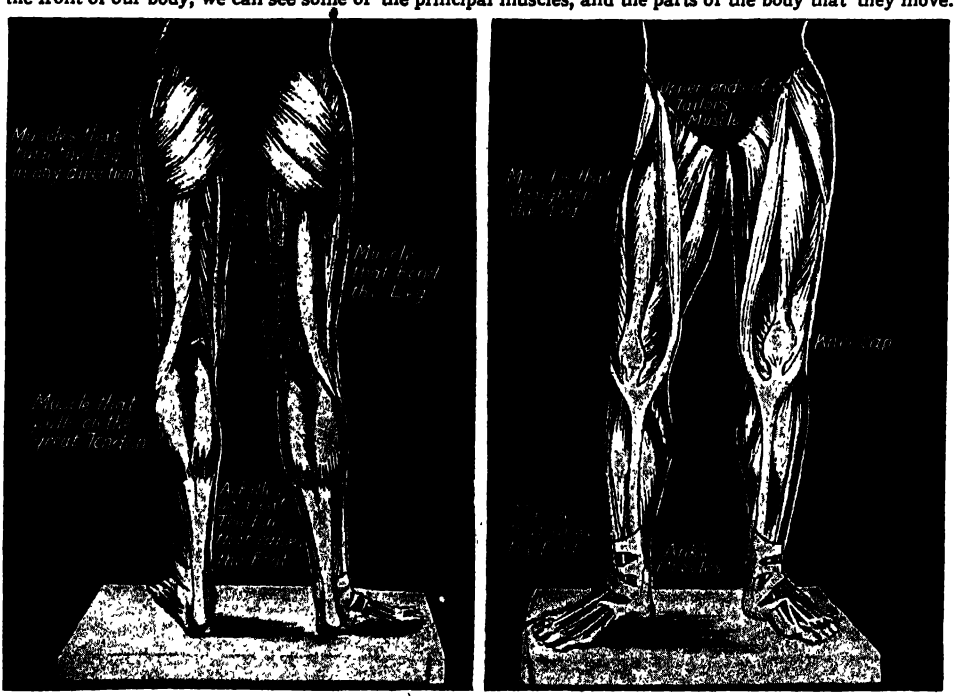
The two earliest Greek writers whose works have come down to us, Homer and Hesiod, refer to some of these constellations by the same names that we give them to-day. They speak of the Bear or the Waggon, part of which is also known to us as the Dipper ; of Orion, whose sparkling belt of three bright stars we all know so well ; of the Dog of Orion, with its starry nose formed by Sirius ; and of the Pleiades. All these constellations are shown in this picture of the sky in winter. The Bible also, in those parts of it which come to us from more ancient times, refers to stars and constellations which have been identified as the Pleiades, Orion, Arcturus, and the twelve signs of the Zodiac We can read of these by name in Job xxxviii. 31, 32.

The photograph on page 2637 was taken by Dr. Max Wolf, and is reproduced here from " Knowledge."

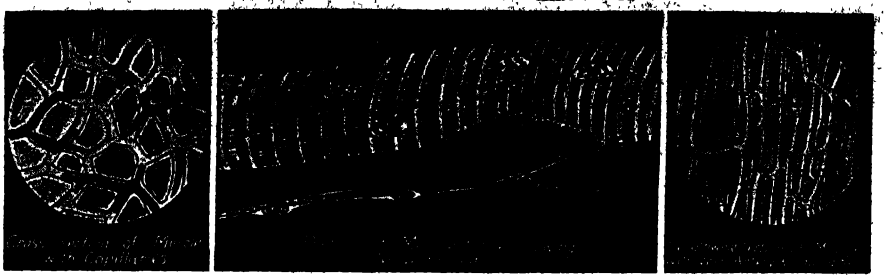
THE MACHINERY THAT MOVES THE BODY



The bones of our bodies are covered with flesh, and this flesh is called muscle. It is the muscles of the body that enable us to move about and do things, and in these pictures, which show both the back and the front of our body, we can see some of the principal muscles, and the parts of the body that they move.



The muscles are not all alike. Some are thin, flat sheets of flesh, others are long and narrow, and others thick, like ropes. They are made up of millions of tiny living cells, that have grown into narrow threads, and are bound together in bundles. The muscles are joined to the bones by tendons, which are bands of gristle.



OUR MUSCLES & THEIR MASTERS

CONTINUED FROM 2574

WE have learned about the bones and the skeleton which they make up. We know, too, that the joints between the bones are nearly all made so that the bones can move upon one another. Now, when we come to think of it, we shall see that the only thing we can do in the world is to *move things*; and this we do by moving our own bodies, as I am moving my hand now in writing. So the question is, how the bones are moved at the joints, and if we compare the picture of a man's skeleton with the picture of what the same man would look like if his skin only were taken off, we see at once that the skeleton is clothed, nearly all over, with flesh.

At some parts the fleshy clothing of the bones is lacking; for instance, over the knuckles and one side of the shin-bone, and if we put our hand on these parts we can feel the bone very plainly just under the skin, because there is no flesh there, as on other parts of the body. But if we compare a skeleton only and a skeleton with flesh, side by side, we see that the muscles or flesh make up a very great part of the whole bulk of the body. For example, compare the thigh-bone with the thigh itself, where the bone is completely covered, from end to end, by a great group of muscles, which run down over the knee-joint. We may say that, just as the body includes a bony system, so it includes a muscular system; and we see that, in a sense, the whole body would be useless without the muscles, for *they carry out its orders*. Also the life of the body depends upon *some* of the muscles; for instance, those by which we breathe, and which you, and I, and every one of all the 1,600,000,000 human beings on the earth, are using at this moment.

Now, we must get right ideas of what a muscle is like. Of course, muscles vary in shape, according to the work they have to do. Some are thin and flat sheets of flesh, others are long and narrow, and so on. But the most usual kind of muscle ends in a sort of rope that runs to the bone which the muscle means to pull upon, and is firmly fixed to it. If you look at the front of your own wrist, or if you feel at the back of the knee, whether on the inside or the outside, you will find some of these strong ropes. The proper name for them is *tendons*. Sometimes they are called *sinews*. Long ago they used to be called nerves—which are utterly different things—and so, when a man wrote very strongly and powerfully, they used to say that he wrote "nervous English"—meaning *sinewy* English. Nervous now means something rather the opposite of strong, and so I have explained what the phrase "nervous English" means, in order that we may not have any wrong idea in our minds when we hear it used, or read it in a book. A tendon or sinew at the end of a muscle is quite different from the things which bind the joints together, which are called ligaments, a word which really means binding things.

In the picture on page 2649 we see that a muscle has a body, which is the red flesh, the really living part of the muscle, and at the ends are whitish ropes, the tendons by which the muscle pulls on the bone. The picture shows us the *biceps* muscle of the arm. It is so called because it has two heads or starting-places; these join and form its body, and then comes the great tendon which ends in one of the bones of the forearm.

THE GREAT MUSCLES THAT WORK OUR ARMS, AND HOW THEY GET POWER

When the biceps or any other muscle contracts, or acts, its fleshy part shortens and swells, and so the two ends of the muscle are made to approach each other. Every boy knows how the body of his biceps muscle swells when he bends his elbow; for this is the great lifting-muscle of the arm. Now, when a muscle contracts and moves things, it does work and spends power. We must find where the power comes from, for we are certain that the muscle cannot *create* it.

All muscles are richly supplied with blood. This helps to give them their red color, though most muscles also have in them a red coloring matter which is peculiar to muscles and not found in blood. It is the blood that supplies muscles with the power which they show when they act. The burnable food-stuffs are carried to the muscle, especially sugar, which is the chief muscle food; and in the muscle they are burned by the oxygen which the blood also sends there. This burning has two results, one which is easy to understand, and another which no one understands. The first is that heat is produced. The blood leaving a muscle is thus hotter than the blood entering it. Now we see at once why hard running or jumping makes us hot.

A LIVING MACHINE MADE UP OF MILLIONS OF PARTS

The second result of the burning in the muscle is that, as we have just learned, the muscle shortens; but how it does so, on the instant, and returns, on the instant, no one can guess. Every machine—and a muscle is a living machine—turns some of the energy supplied to it into heat; not all into work. The more work it gives, and the less heat, the better is the machine, for we want work and not heat. Any muscle is better in this respect than most machines made by man; and, further, the heat it *does* make *is* wanted, and properly-fed muscles never wear out.

When we examine, not the tendon or rope at the end of a muscle, but its red fleshy part, we find that this consists of millions of living cells, that have grown into the form of narrow fibres or threads, and are bound together in bundles. The mystery of the contraction of a living muscle lies inside the protoplasm of the muscle-cells. We learned about protoplasm in those parts of this book beginning on pages 1121 and 1195. The muscles of the skeleton, such as the biceps, differ from those which cover, for instance, the stomach. The first kind, which is under the influence of the will, shows tiny cross striping when seen under the microscope; the other kind, which acts apart from the will, shows no such striping. So the two kinds of muscles are called voluntary or striped, and involuntary or unstriped. *Voluntas* is Latin for the *will.*

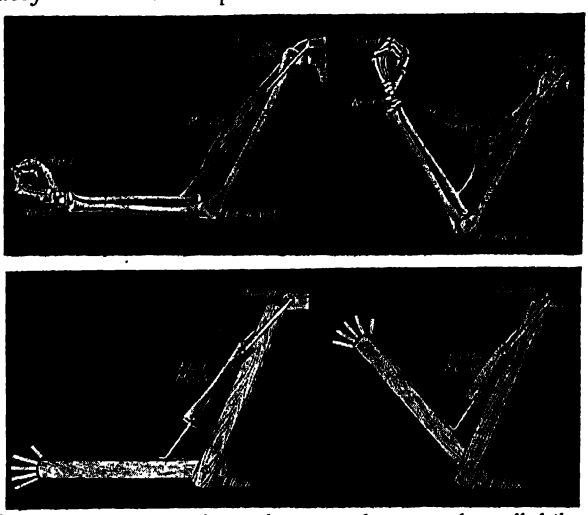
STRENGTH OF LIFE, WHICH IS MORE IMPORTANT THAN STRENGTH OF MUSCLE

We can watch the development of a muscle from muscle-cells, which at first are round and small. When a muscle grows by exercize, certain muscle-cells, which are in it, but have never developed into active muscle-fibres, are made to develop. When they are all used up, the muscle will grow no bigger, however long or well it is exercized. Different people differ widely in the number of cells out of which they can make muscle-fibres by exercize. A man who has never given a thought to the subject may be naturally two or three times as strong as many others who may spend a large part of their lives in doing gymnastics.

The size of the muscular system is of importance in a few cases, as where a man is doing hard physical labor like lifting trunks; but it is of no importance in any other way. It has nothing to do *at all* with strength of life, or *vitality*, as it is called. But people always confuse strength of muscle, or muscularity, with strength of life, or vitality. Women are, in general, much less muscular than men, but they have

more vitality. They live longer on the average, and can endure more loss of blood, more exposure, longer starvation, a greater quantity of poison, than men. On every possible ground, strength of life is worth having. Strength of muscle, which has no more to do with strength of life than a man's height has to do with his Christian name, is not of so much importance for human beings, who have conquered the world, and live in it, not by strength, but by skill.

It is quite right that we should desire to have our muscles in good health and fitness, but we must be sure that we clearly understand what muscles are. They are instruments of *our* purposes. In themselves, they are mere lumps of flesh, and, so far from their large size being useful to us, the larger they are the more food they require, and all the greater is the quantity of waste matter they pour into the blood. So it is an expensive matter—expensive in life as well as in money—to keep up a large staff of muscles. The only reason for taking care of the muscles is in order that they shall be able to do their work as instruments of our will and purpose. If they can do that, we should be content. But, unfortunately, there are people who tell us that the great aim of our existence should be physical culture, by which they mean making the muscles as big as we can, and these people wish us to tie ourselves by ropes and pulleys and things to our bedroom doors every morning, and then to lift weights and squeeze springs and pull indiarubber cords, and so on. For a creature who lives by mind and skill, the desire to have enormous muscles is absurd.



We see, in the upper picture, how one of our muscles, called the biceps, lifts the arm by swelling up and drawing the bones together. The muscles are elastic, and can expand and contract. Their action is explained by the lower picture, which shows a rough wooden model of the arm worked by elastic in place of muscles.

If we are to learn how to take proper care of our muscles, we must go back to the workings of the body, and find out what happens when our muscles carry out our orders. Into every muscle of the body we find running at least one round whitish cord, which is called a nerve. One of these nerves, which runs down to give itself to several of the muscles of the forearm, passes behind the elbow for a short distance practically between the skin outside it and the hard bone underneath it. If hit, it makes us uncomfortable, and we call it the "funny-bone." It is no more a bone than it is a comet, but still that is the name we know it by. This nerve is what is called a *mixed* nerve, for it has in it nerve-fibres running to muscles and making them move, and others running from the skin up to the brain for purposes of feeling. These two sorts of nerve-fibres are called motor and sensory. Everyone knows exactly which fingers have their skin supplied from the "funny-bone" nerve, for when it is hit we feel tingling in the little finger, and the side of the ring finger that is next the little finger. The fibres running through the nerve from these fingers have been hit, and make us think we feel something in those fingers. The real name of the "funny-bone" is the ulnar nerve, because it runs along the bone of the forearm called the ulna.

Now we must consider the motor fibres in that and any other nerve that has motor fibres; especially we must see what we mean when we say that every muscle has motor nerve-fibres running into it. Suppose that, by an accident, the motor nerve of a muscle is cut; or suppose that, by taking too much alcohol, or lead, or arsenic, the nerve-

fibres have been poisoned and killed, so that they might just as well have been cut across, so far as the muscle is concerned. Two results always happen. The first is that the muscle cannot be used. It is paralysed, and lies still, however eagerly we try to use it. For it is motor nerves that are the motors and the masters of muscles.

MUSCLES THAT ARE THE SERVANTS OF THE NERVES

The second result is in some ways not less interesting. It is that the muscle always begins to waste and grow soft and flabby and small. And we know that the motor nerve is not merely the master of muscle, but a master that takes good care of his servant. Some kind of influence, which we understand no better than we understand any other kind of nerve-current, runs down all motor nerves to the muscles which they supply, and keeps those muscles in health.

Muscles, then, are the servants of nerves; and there is a special way of putting this which is so good that I think we ought to learn it. The word "organ" means instrument. We say that the eye or ear is the *end organ*—the instrument at the end—of the eye-nerve or the ear-nerve, just as the telephone on the desk might be called the end organ of the telephone wire. And now students of this subject have taught us that we ought to look upon muscles as the end organs of motor nerves; just the instruments which carry out their orders. If men and women—those who look after schools, who look after soldiers, or are in any way responsible for the life and guidance of others—knew this truth, that muscles are just the servants of nerves and are to be treated as such, we should soon learn how to make almost all people into the healthiest and most useful kind of human beings.

HOW THE MUSCLES WITHER AWAY, IF THEIR MASTERS ARE DESTROYED

If a frog is killed, it is quite easy to separate from its leg the muscle of its calf and the nerve that is its master. If this is kept warm and moistened with water containing a little salt, it will live for quite a long time. Such a thing is called a "nerve-muscle preparation," and you may spend months doing nothing but learning from it. If you pinch the muscle, or put chemicals on it, or if you even apply certain kinds of electricity to it, *little happens*; but if you do these things to the nerve, the muscle contracts so long as nerve and muscle are *alive*. *The muscle will only obey orders from its master.* Also, we can learn what weariness or fatigue is, and we find that fatigue is scarcely at all a question of muscles, but it is a question of the muscle's master—nerve. And now we must learn where the nerve comes from.

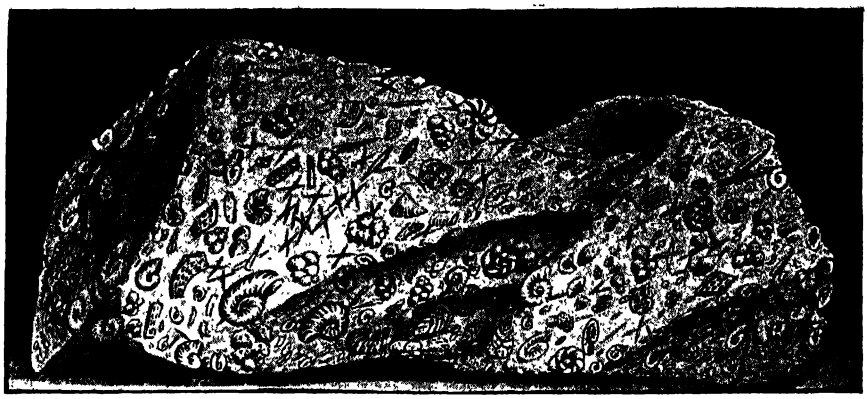
The nerve is a fibre or many fibres, running out from a nerve-cell or nerve-cells. After all, the nerve is only the channel of communication. It starts nothing, any more than the muscle does. The real master is the nerve-cell in the brain or the spinal cord. For every muscle in the body we now know the exact group of nerve-cells, in the lower part of the brain or the spinal cord. If anything destroys them, the muscle is paralysed, and will wither away. Muscle is the servant of nerve-cells, and nerves carry the orders to the muscles.

HOW EDUCATION HELPS TO GIVE US CONTROL OVER OUR MUSCLES

And this leads us to the greatest point of all. What we want, what every creature that has muscles wants, is to do things, to carry out a *purpose*. We care nothing about muscles as such, and we never give an order to any single muscle alone. Why, no animal, no child, very few grown-up people know anything about muscles; but they can do things all the same! In the highest part of the brain, where the willing is done, no muscles are represented, *as such*, by nerve cells. The groups of nerve-cells in the brain represent, not individual muscles, but *groups* of muscles; or, we may say, *purposes*, for each group of muscles stands for a purpose. In every movement that we make, except things like those sudden twitches of the legs that we sometimes get in bed, *many* muscles are involved.

Half the education of a child consists in turning the clumsiness of the baby into the skill of the man or woman; training the muscles, not to get *big*, but to act in groups as the instruments of purposes. That is why some day we shall have more of play and games in teaching children, because Nature knows that they must have many play-purposes when they are young, if they are to carry out well their work-purposes when they are older.

THE NEXT PART OF THIS IS ON PAGE 2727.



WHERE DOES CHALK COME FROM?

CONTINUED FROM 2540

THE chalk seen in cliffs on the south coast of England and the chalk used on a blackboard or for drawing with are the pressed-together remains of the bodies of tiny creatures that once lived in the sea. The rest of their bodies has disappeared ages ago, but the calcium carbonate, which is chalk, has not been altered through all these years. As they died, it fell to the bottom of the sea, and was piled up there, often to very great thicknesses, as we could see for ourselves if we looked at a high chalk cliff.

This went on for many thousands of years, no doubt, but, compared with the deposits of many of the rocks formed at the bottom of the sea, the chalk deposit was quite a quick one. This means, of course, that the cliffs at such a place as Dover were once at the bottom of the sea. If you walk in many parts of England or some parts of France, and find that you have only to scratch the soil to find chalk underneath, or if you pass in a train through a chalk hill, you may reflect that all this was once at the bottom of the sea.

IS THERE GOLD IN THE SEA?

When we come to make a close study of earth or air or sea, we find some minute traces of all sorts of unexpected things in all of them—though it may be only one part in a million. Gold is one of the things we should not expect to find in sea-water, but we do find it in a quite recognizable quantity. If we consider the enormous bulk of the sea, we find that the total quantity of gold in it must be considerable. Yet, fortunately, it is not enough to repay the cost of getting it out, and so no one does so, except chemists, who do it for love of Nature and not for love of gold. I say "fortunately," because we know that the gold is worth very little in itself, *really*, and it is well that a vast quantity of human labour and life is not wasted in extracting it from the sea. If we learn to make gold quite easily—men possibly will learn some day—we shall be still less inclined to seek it in sea-water, which contains things far more precious than gold.

IS THERE RADIUM IN THE SEA?

This wonderful element, radium, which at first was thought to be one of the rarest of all things, is now found to occur everywhere, and to be of the utmost importance wherever it occurs. We find radium in the water of rivers, and we find still more of it in the ocean wherever we look for it. It is clear that the radium, or rather the element

uranium, from which radium is always being formed, accumulates slowly in the ocean as the rivers bear it there, just as do the salts which the rivers carry. At one time there must have been much less radium than now in the sea, just as there must have been much less salt. Also, we find a considerable quantity of radium in the present deposits at the bottom of the sea, and in past deposits, such as chalk, for example. The total amount of radium in the deposits, or "oozes," at the bottom of all the oceans must be very large, and its consequences, both there and in the sea-water itself, are most important, because, wherever radium is, there it is constantly producing heat. We are just beginning to learn that this presence of radium in the sea and the sea's deposits must have played a part perhaps greater than any other one thing in the history of the changes which the surface of the earth has undergone.

HOW MUCH WATER IS THERE IN THE SEA?

Most of us know that much more than half the whole surface of the earth is covered with water, and if the earth had been of a slightly different size from the size it is, the whole of its surface would be one great ocean. A recent estimate of the extent of the ocean's surface may be trusted as a very careful and precise one. It is rather higher than others we have heard, and now we may take it that *five-sevenths* of the earth's surface is covered with water. If now we could learn the average depth of the sea all over the world, it would only need a big multiplication sum to answer this question.

I will not work the problem here, said the Wise Man, but I think I can tell you the other factor you need. We find great variations in the depth of the oceans—places where the highest mountain might be buried, and great shallow areas, too; but the latest result of an enormous number of soundings taken in every part of the sea, except round the Poles, is that the average depth of the oceans the world over is a little under two and a half miles. This is probably a great deal deeper than you would have thought, and it means a rather long problem if you want to learn the number of *cubic miles* of water on the earth.

WHAT MAKES THE NOTE WHEN THE BOW IS DRAWN ACROSS THE FIDDLE STRINGS?

The note is, as we know, a sound-wave, or a series of to-and-fro vibrations in the air, produced by some vibrating body, which in this case is the violin string. If the string is merely plucked, it only gives a sound that lasts for a moment; in this respect it differs from the string of a piano, which, when struck or plucked, will vibrate for several seconds. We express this difference by saying that the vibrations of a piano string or a harp string are *free*, while those of a violin string are said to be *forced*. When we play with the bow in the ordinary way, the string is forced to vibrate so long as the bow is drawn across it, but directly the bow is withdrawn the string becomes still, and does not continue to vibrate for some time, as in the case of strings that give "free vibrations." If the bow is drawn *very gently* across the string, only part of it vibrates, and so we get a beautiful, thin, soft, and very high note, which is called a *harmonic*, meaning a sound that is in harmony with the note which the whole string makes when it vibrates.

WHAT IS THE DIFFERENCE BETWEEN DISCORD AND HARMONY?

To a certain extent, harmony is a matter of taste and custom. Modern musicians play chords which strike us as quite harmonious, though we know that our ancestors thought them intolerable. But there must always remain a very real difference between harmony and discord, and we find, when we study it, that it is due to the *proportions* between the various notes that are sounded together. A musical note depends upon sound-waves of a certain rate, say, 800 little waves in a second. Now, the notes that are most harmonious with this are those in which the waves bear a very simple proportion, in their number, to 800. A note made by 1,600 vibrations in each second is, indeed, so harmonious that we do not call the two a harmony at all, for the higher note, the one with twice as many vibrations, is simply the octave of the other.

Similarly, a note of 400 vibrations in each second is the octave below. If we take the common chord which everyone knows so well, such as C, E, G, C, on the piano, which everyone finds perfectly

harmonious and satisfying, we find a proportion between the vibration numbers of the notes which is correspondingly simple. If the high C were 800, the lower one would be 400, the E 500, and the G 600. In other words, the proportion of the notes in the common chord is simply 4, 5, 6, 8. This simple proportion between the notes is the basis of harmony, and the absence of it is the basis of discord. *Why* our ears should find the one pleasant and the other painful is a question too difficult for us to answer yet.

DOES A BRIDGE SHRINK IN THE SUN?

Certainly not. On the contrary, a bridge expands, or gets larger, in the sun or in the daytime or in the summer, and shrinks, or contracts, in the shade or at night or in winter. The rule is that heat makes everything expand, while cold makes everything shrink. Cold is not a thing, but the absence of heat; and so we may say that everything occupies more or less space according to the amount of heat in it—that is, of course, if other circumstances, such as the pressure round the thing, are kept the same. Metals have a striking way of changing their volume, or size, under the influence of heat, and this change is noticeable in the case of iron or steel bridges such as are built nowadays. If the engineer does not know that bridges expand in the sun, he will build a bridge that is certain soon to warp and strain, and even to crack. He has to reckon on the amount of expansion that will occur under the influence of such heat as the bridge is likely to be exposed to, and he must allow for it. In a bridge like the Brooklyn Bridge, many inches must be allowed for its change of size according to its temperature.

WHY, WITH A MINT WHERE MONEY IS MADE, HAVE WE SUCH A BIG NATIONAL DEBT?

I am afraid we can't hope to pay the National Debt from the Mint, said the Wise Man, for the Mint does not get for nothing the gold and silver and other metals out of which it makes our money. These have to be paid for, like everything else, and that means, of course, that in the long run we pay for them. Nor does it help us at all that the Treasury Department can print paper money and put any figure it likes on it. Bills cost very little to make, but a gold eagle costs its full value. Bills are of no value in themselves, but are valuable because they represent money in existence, and they will not pay the people to whom we owe the National Debt.

No; this debt is one which can only be paid by the work and often the very lives of the people who do work in America to-day. Every year we have to provide the interest, as it is called, on this debt, and sometimes, when the men responsible for the management of the nation's money are wise and careful, we pay off a little of the debt itself. This is the price we have to pay for the wars of past generations, and the same is true for most countries that have a National Debt.

If every generation had to pay for its wars, there would be fewer wars, and the people who try to make them—for it is usually a few people who really make a war—would be laughed at or punished, instead of being called patriots. Patriots of this kind injure a nation while they are alive, and then for generations afterwards millions of people are taxed and made to do without the fruits of their labor, to pay for the wars with which they had nothing to do, and which very often have done them harm. The National Debt of any country is a burden on the people like any other debt.

WHAT MAKES A VOLCANO?

Here is a question which no one has been able to answer. We can examine volcanoes, notice their position, and understand the character of the stuff that comes out of them; but the problem of explaining how volcanoes ever come to be formed is far too difficult for us to answer. But it seems more than probable that before long we shall be able to guess at the truth of this question, because we are just beginning to learn, in a more than vague and general way, how ordinary mountains are formed. And it is radium, this extraordinary element, of whose existence no one knew fifteen years ago, that promises to give us the key to the making of mountains and volcanoes.

We think this because we find radium in all the rocks we examine, however deep we go, just as we find it in sea-water and in chalk; and if this thing, always producing large quantities of heat wherever it is, is found in all the

rocks of the earth's surface, we begin to see how things like mountains, including volcanoes, may have been formed.

DOES RAIN MELT THE ROCKS?

There are two things in rain, besides the water itself, that have a great power of melting things; and even the very hardest rocks, such as granite, which look as if no amount of rain could affect them, are melted down by it in time. These two things are oxygen and carbon dioxide. Alone they have no effect on the rocks, but dissolved in water they form important agents in what is called weathering. Carbon dioxide dissolved in water will attack limestone, melting it, so that it may be carried down stream into rivers, finally to reach the sea.

Carbon dioxide, acting with heat and cold, and in union with other substances, will even melt portions of hard rocks, such as granite, setting free the glassy part, which becomes sand first, and finally turns into sandstone. This process goes on very slowly, but it goes on very certainly; and in both of these respects it is like the greater number of Nature's most important processes. The two acids in rain are still more important in their relation to life; the carbonic acid, as we already know, and the nitric acid are part of the food upon which the plant lives.

WHY CAN WE SEE THROUGH GLASS BUT NOT THROUGH THE THINGS IT IS MADE OF?

Well, glass need not be transparent, as we all know, for it may be made in such a way as to form what we call ground glass, and be only *translucent*—letting light through, but scattering it so that the objects from which it comes are not visible.

But even so it is very different from the quite opaque things, such as sand, from which it is made. The answer to the question is that the *transparency* or *opacity* of a thing depends on the way in which its molecules are arranged. Many other substances, besides glass, can be made, when they are melted, to change into what is called a *vitreous*—which is Latin for *glassy*—form; and in this the molecules lie beside one another in such a regular way that they allow light to pass through them. All glass cuts off some light—you will notice that spectacle lenses throw a light-grey shadow on a piece of white paper—and glass has not exactly the same degree of transparency for different rays of light; but such transparency as it has, depends on the arrangement of its molecules.

Glass does not burn when it is heated, nor does the sand of which it is made. The reason is that, being fully burned, or oxidized, already, it cannot burn again.

WHY DO WE SOMETIMES GET A "STITCH" IN THE SIDE WHEN WE RUN?

When we run we require a quick renewal of the oxygen in our blood, as we are using it up very quickly in our muscles. Therefore we have to breathe quickly and deeply, and this we do especially by means of the great breathing muscle called the diaphragm, about which we read on page 1651. This muscle, though strong and broad, is rather delicate at certain points. It is attached to the inner surfaces of each of the six lower ribs, on each side of the body, by rather fine slips of fibre. These same ribs are also moved by muscles that lie between each two of them; and the explanation of a "stitch" probably is that, as the ribs move rapidly and rather forcibly when we breathe quickly and deeply, sometimes one of the attachments of the diaphragm gets a little strained, and that causes the pain we feel.

We think of a stitch as a bad thing, but it is really good for it is the warning that prevents us from doing serious harm to the slightly strained fibres. They get a rest, and probably when we start again we so arrange as not to throw quite so much work upon them. The practised runner does not get a stitch because, by practice, he has learned to use all his breathing muscles, though unusually hard, yet in a nicely balanced way, so that no part of them is strained.

WHAT MAKES US DIE?

The great cause of death among human beings is disease, and this is a fact never to be forgotten, because it offers such a great contrast to the animal world. With our intelligence, and our laws and our habits of life, we have very nearly abolished death by starvation and by murder. Therefore, except for accident, we should die of old age, were it not that we are exceedingly liable to disease, which is quite a small and unimportant matter in the lives of practically all creatures but ourselves.

We are now learning that we bring diseases upon ourselves by doing unnatural things, which animals and plants do not do. We eat when we are not hungry, and cheat our appetites with dainties, and so wear out the organs that have to deal with food. We take huge quantities of alcohol, which no animal ever touches. We live in foul air, shut up from light and freshness, while our dogs and cattle live in the air and sunshine. We create and breathe smoke, we neglect our sleep, and do a hundred other stupid things. The penalty for this is disease, and the most important lesson to be learned from the study of life is that disease is almost a peculiarity of *man*, that he brings it upon himself, and that it will be abolished when man learns a little of the wisdom which any animal, by its mode of conducting its life, teaches him, unless, indeed, it be a domestic animal which has caught some of our own bad habits.

WHY IS IT THAT WE DIE?

Yet when men have learned how to avoid disease, and when death from old age is as common as it is rare to-day, even then the great fact of death will remain; though it will be a very different thing from death to-day—the most terrible feature of which is that it almost always comes too soon—yet we shall still have the same problem to solve which has troubled people in all ages. Perhaps we can begin to discern some kind of an answer if we look, not at the life of man alone, but at all the life of the earth.

Then it will seem as if death were the necessary condition of *more life*; it will be seen that all death is yet the beginning of further life upon the earth, that nothing is really wasted or lost; and even that, if it were not for death and birth, life could never have evolved from its lowly beginnings in the humblest animals and plants to what it is already. And even in our own lives we may see that there are great compensations for death—if we could see far enough, we might even see that death makes life worth living. The best things in life are parenthood and children and childhood. If there were no death, then there could be no birth, for there would be no room for children, and a world without a child would not be worth living in.

The question of food supply is practically the first question for all living things. Air is equally necessary, but it can always be had everywhere; food is not so plentiful. The commonest cause of death among the lower creatures, both animals and plants, is starvation. This especially affects the young offspring of these creatures, and the greater number of their young die from want of food.

WHAT MAKES THE LOWER CREATURES DIE?

Next to death by starvation among lower creatures is death by murder, if we may call it by so ugly a name. This does not apply very much to the vegetable world, as plants do not live upon each other to any great extent; but enormous numbers of young plants die because they are eaten by animals, and a small number of animals die because their bodies are invaded by tiny plants that live upon them. In the animal world, killing and being killed for food goes on without ceasing.

We must not think of this as a very cruel process, involving terrible pain, for that is not so. Animals cannot suffer pain to the same extent as we do, and their death is usually swift and merciful. A single human being, in the course of his life and death, usually suffers far more pain and distress than many animals put together. What we call disease, a far more painful and cruel thing than being instantly killed, accounts for comparatively few deaths among the lower creatures.

WHY DO LOBSTERS TURN RED IN BOILING?

The red color of a boiled lobster is simply due to a chemical change that occurs in the brown coloring matter of the shell when it is heated. It is curious that red coloring matter, such as the hæmoglobin of our blood, turns brown when it is heated, but the brown of a lobster's shell turns red. If the lobster were red in the sea he would be too easily seen, and would not be able to catch his food unawares, so he would die of starvation.

The question reminds me of the celebrated definition of a crab or a lobster as a "red fish that walks backwards." This, you know, is a perfectly correct definition, except that a lobster is not red, it is not a fish—but a much humbler kind of animal—and it does not walk backwards!

THE NEXT QUESTIONS ARE ON PAGE 2733.

WHEN I'M GROWN UP

I THINK, when I'm a grown-up man,
I'd like to be
A bus conductor if I can,
Or, let me see—
It would be very, very nice
To keep a shop,
Where I could eat vanilla ice
And never stop.

I'd like to be a soldier, too,
It must be fun
To lie down flat, as soldiers do,
And fire a gun.

And then I'd love to flour my face
And be a clown,
Like two we saw, who ran a race,
And both fell down.

But when I'm tired, it seems to me,
What I enjoy
The best of all is just to be
My mammy's boy.





WHEN MUMMY'S AWAY

I WASN'T brave, I *had* to cry
The other day
When darling mummy said good-bye
And went away.

The time seemed very, very long
Alone with nurse;
And everything I did went wrong,
Which made it worse.

For, as I ran across the hall
With Sybil Grace,
My fav'rite doll, I let her fall
And cracked her face.

And then I tumbled on some stones
And cut my knee;
Nurse tied it up, and gave me scones
With jam for tea.

Though she is kind, and mended Grace,
How could she tell
I wanted *mum* to kiss the place
And make it well?

But now my troubles seem to go,
And all is bright,
For mummy's coming home, I know
To-morrow night!



JOHN GILPIN

WILLIAM COWPER, in this celebrated ballad, has made fun, in his own quiet way, of a very worthy old linen-draper who used to have a shop in Paternoster Row, London, where he died in 1791 at the age of ninety-eight. The story was told to the poet by a lady friend in order to entertain him, as he was inclined to melancholy, and, thanks to his genius, it has served to amuse multitudes of readers, and will ever remain a favorite with the countrymen of the poet and the linen-draper. The charming illustrations which we give with the poem are from the well-known drawings of the late Randolph Caldecott, a famous humorous artist.

JOHN GILPIN was a citizen
Of credit and renown,
A train-band captain eke was he
Of famous London town.

John Gilpin's spouse said to her dear,
"Though wedded we have been
These twice ten tedious years, yet we
No holiday have seen.

"To-morrow is our wedding day,
And we will then repair
Unto the Bell at Edmonton
All in a chaise and pair.

"My sister and my sister's child,
Myself, and children three,
Will fill the chaise; so you must ride
On horseback after we."

He soon replied, "I do admire
Of womankind but one,
And you are she, my dearest dear,
Therefore it shall be done.

"I am a linen-draper bold,
As all the world doth know;
And my good friend, the Calender,
Will lend his horse to go."

Quoth Mrs. Gilpin, "That's well said;
And for that wine is dear,
We will be furnish'd with our own,
Which is both bright and clear."

CONTINUED FROM 2514

John Gilpin kiss'd his loving wife;
O'erjoy'd was he to find
That, though on pleasure she was bent,
She had a frugal mind.

The morning came, the chaise was brought,
But yet was not allowed
To drive up to the door, lest all
Should say that she was proud.

So three doors off the chaise was stay'd,
Where they did all get in,
Six precious souls and all agog
To dash through thick and thin.

Smack went the whip, round went the wheels,
Were never folk so glad;
The stones did rattle underneath,
As if Cheapside were mad.

John Gilpin, at his horse's side,
Seiz'd fast the flowing mane,
And up he got, in haste to ride,
But soon came down again.

For saddle-tree scarce reach'd had he,
His journey to begin,
When, turning round his head, he saw
Three customers come in.

So down he came; for loss of time,
Although it grieved him sore,
Yet loss of pence, full well he knew,
Would trouble him much more.

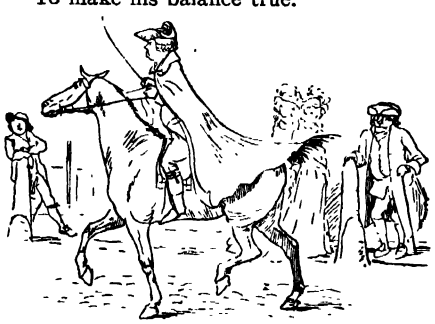
'Twas long before the customers
Were suited to their mind,
When Betty, screaming, came downstairs,
"The wine is left behind!"



"Good lack!" quoth he, "yet bring it me,
My leathern belt likewise,
In which I bear my trusty sword
When I do exercise."

Now Mistress Gilpin (careful soul!)
Had two stone bottles found,
To hold the liquor that she loved,
And keep it safe and sound.

Each bottle had a curling ear,
Through which the belt he drew
And hung a bottle on each side,
To make his balance true.



Then over all, that he might be
Equipp'd from top to toe,
His long red cloak, well brush'd and neat,
He manfully did throw.

Now see him mounted once again
Upon his nimble steed,
Full slowly pacing o'er the stones,
With caution and good heed.

But finding soon a smoother road
Beneath his well-shod feet,
The snorting beast began to trot,
Which gall'd him in his seat.

So, "Fair and softly," John he cried,
But John he cried in vain;
That trot became a gallop soon,
In spite of curb and rein.

So stooping down, as needs he must
Who cannot sit upright,
He grasp'd the mane with both his hands,
And eke, with all his might.

His horse, who never in that sort
Had handled been before,
What thing upon his back had got
Did wonder more and more.

Away went Gilpin, neck or nought;
Away went hat and wig;
He little dreamt, when he set out,
Of running such a rig.

The wind did blow, the cloak did fly,
Like streamer long and gay,
Till loop and button failing both,
At last it flew away.

Then might all people well discern
The bottles he had slung;
A bottle swinging at each side,
As hath been said or sung.

The dogs did bark, the children scream'd,
Up flew the windows all;
And every soul cried out, "Well done!"
As loud as he could bawl.



Away went Gilpin—who but he?
His fame soon spread around,
"He carries weight! he rides a race!
'Tis for a thousand pound!"

And still as fast as he drew near,
'Twas wonderful to view
How in a trice the turnpike men
Their gates wide open threw.

And now, as he went bowing down
His reeking head full low,
The bottles twain behind his back
Were shatter'd at a blow.



Down ran the wine into the road,
Most piteous to be seen,
Which made his horse's flanks to smoke
As they had basted been.

But still he seem'd to carry weight,
With leathern girdle braced;
For all might see the bottle necks
Still dangling at his waist.

Thus all through merry Islington
These gambols he did play,
Until he came unto the Wash
Of Edmonton so gay;

And there he threw the wash about
On both sides of the way,
Just like unto a trundling mop,
Or a wild goose at play.

At Edmonton his loving wife
From the balcony spied
Her tender husband, wondering much
To see how he did ride.

"Stop, stop, John Gilpin, here's the house!"
They all aloud did cry;
"The dinner waits, and we are tired."
Said Gilpin, "So am I!"

"What news? What news? Your tidings tell;
Tell me you must and shall—
Say, why bare-headed you are come,
Or why you come at all?"

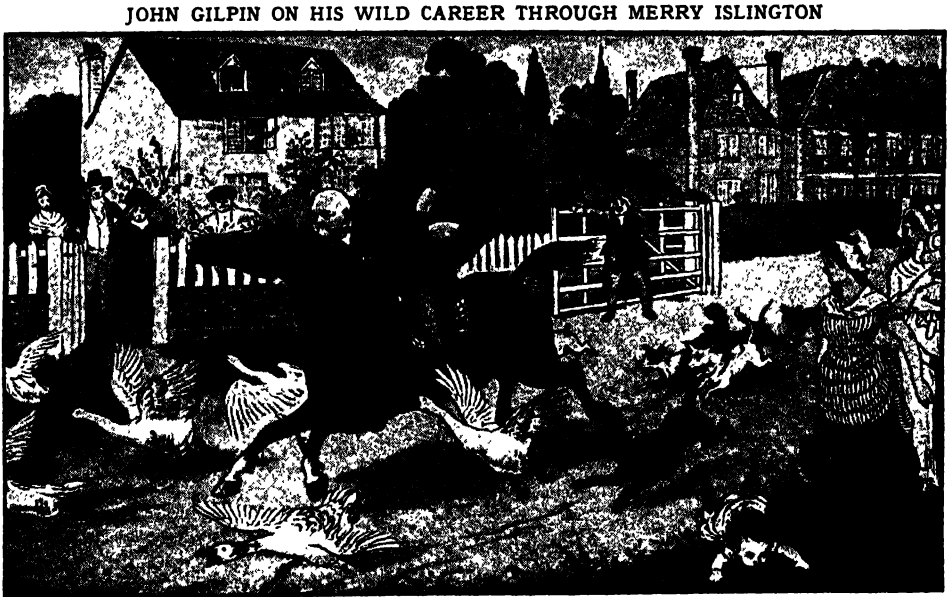
Now Gilpin had a pleasant wit,
And loved a timely joke;
And thus, unto the Calender,
In merry guise he spoke:

"I came because your horse would come;
And, if I well forebode,
My hat and wig will soon be here,
They are upon the road."

The Calender, right glad to find
His friend in merry pin,
Return'd him not a single word,
But to the house went in.

Whence straight he came, with hat and wig,
A wig that flowed behind;
A hat not much the worse for wear,
Each comely in its kind.

JOHN GILPIN ON HIS WILD CAREER THROUGH MERRY ISLINGTON



**The dogs did bark, the children scream'd, up flew the windows all;
And every soul cried out, "Well done!" as loud as he could bawl.**

But yet his horse was not a whit
Inclin'd to tarry there;
For why? his owner had a house
Full ten miles off, at Ware.

So like an arrow swift he flew,
Shot by an archer strong;
So did he fly—which brings me to
The middle of my song.

Away went Gilpin, out of breath,
And sore against his will,
Till, at his friend the Calender's,
His horse at last stood still.

The Calender, amazed to see
His neighbour in such trim,
Laid down his pipe, flew to the gate,
And thus accosted him.

He held them up, and in his turn
Thus show'd his ready wit:
"My head is twice as big as yours,
They therefore needs must fit.

"But let me scrape the dust away,
That hangs upon your face;
And stop and eat, for well you may
Be in a hungry case."

Said John, "It is my wedding day,
And all the world would stare,
If wife should dine at Edmonton,
And I should dine at Ware."

So, turning to his horse, he said:
"I am in haste to dine;
'Twas for your pleasure you came here
You shall go back for mine."

JOHN GILPIN CANNOT STOP AT THE INN



At Edmonton his loving wife from the balcony spied
Her tender husband, wondering much to see how he did ride.
"Stop, stop, John Gilpin, here's the house!" they all aloud did cry;
"The dinner waits, and we are tired." Said Gilpin, "So am I!"

Ah, luckless speech, and bootless boast!
For which he paid full dear;
For, while he spake, a braying ass
Did sing most loud and clear;

Whereat his horse did snort, as he
Had heard a lion roar,
And gallop'd off with all his might,
As he had done before.

Away went Gilpin, and away
Went Gilpin's hat and wig;
He lost them sooner than at first,
For why?—they were too big.

Now Mrs. Gilpin, when she saw
Her husband posting down
Into the country far away,
She pull'd out half-a-crown.

And thus unto the youth she said,
That drove them to the Bell,
"This shall be yours, when you bring back
My husband safe and well."

The youth did ride, and soon did meet
John coming back amain;
Whom in a trice he tried to stop,
By catching at his rein;

But not performing what he meant,
And gladly would have done,
The frighted steed he frighted more,
And made him faster run.

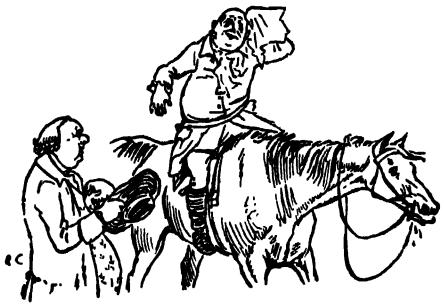
Away went Gilpin, and away
Went postboy at his heels,
The postboy's horse right glad to miss
The rumbling of the wheels.

Six gentlemen upon the road
Thus seeing Gilpin fly,
With postboy scampering in the rear,
They rais'd a hue and cry:

"Stop thief! Stop thief! A highwayman!"
Not one of them was mute;
And all and each that passed that way
Did join in the pursuit.

And now the turnpike gates again
Flew open in short space:
The toll-men thinking, as before,
That Gilpin rode a race.

And so he did, and won it too,
For he got first to town;



Nor stopp'd till where he had got up
He did again get down.

Now let us sing, long live the king,
And Gilpin, long live he;
And, when he next doth ride abroad,
May I be there to see.



KING LEAR AND HIS THREE DAUGHTERS

In the STORY OF FAMOUS BOOKS we can read elsewhere the story of "King Lear," as Shakespeare treats it in the famous tragedy of that name. It was there stated that Shakespeare's great tragedy was founded upon an old English legend, and here is the legend, as told in an old ballad, the author of which is, of course, unknown. In the ballad the king's name is spelt Leir, but here we have given it the same spelling as it has in Shakespeare's play.

KING LEAR once ruled in this land
With princely power and peace;
And had all things with heart's content,
That might his joys increase.
Amongst those things that Nature gave,
Three daughters fair had he,
So princely seeming, beautiful,
As fairer could not be.

So on a time it pleased the king
A question thus to move,
Which of his daughters to his Grace
Could shew the dearest love;
"For to my age you bring content,"
Quoth he, "then let me hear,
Which of you three in plighted troth
The kindest will appear."

To whom the eldest thus began:
"Dear father, mine," quoth she,
"Before your face to do you good,
My blood shall rendered be;
And for your sake my bleeding heart
Shall here be cut in twain,
Ere that I see your reverend age
The smallest grief sustain."

"And so will I," the second said,
"Dear father, for your sake,
The worst of all extremities
I'll gently undertake;
And serve your Highness night and day
With diligence and love,
That sweet and quietness
Discomforts may remove."

"In doing so, you glad my soul,"
The aged king replied;
"But what sayest thou, my youngest girl,
How is thy love allayed?"
"My love" (quoth young Cordelia then)
"Which to your Grace I owe,
Shall be the duty of a child,
And that is all I'll show."

"And wilt thou show no more," quoth he,
"Than doth thy duty bind?
I well perceive thy love is small
When as no more I find.
Henceforth I banish thee my court,
Thou art no child of mine;
Nor any part of this my realm
By favour shall be thine

" Thy elder sisters' loves are more
Than I can well demand,
To whom I equally bestow
My kingdom and my land,
My pompal state and all my goods,
That lovingly I may
With those thy sisters be maintained
Until my dying day."

Thus flattering speeches won renown
By these two sisters here;
The third had causeless banishment,
Yet was her love more dear;
For poor Cordelia patiently
Went wandering up and down,
Unhelped, unpitied, gentle maid,
Through many an English town.

Until at last in famous France
She gentler fortunes found;
Though poor and bare, yet she was deemed
The fairest on the ground;
Where, when the king her virtues heard,
And this fair lady seen,
With full consent of all his court,
He made his wife and queen.

Her father King Lear this while
With his two daughters stayed:
Forgetful of their promised loves,
Full soon the same decayed;
And living in Queen Regan's court,
The eldest of the twain,
She took from him his chiefest means,
And most of all his train.

For whereas twenty men were wont
To wait with bended knee,
She gave allowance but to ten,
And after scarce to three;
Nay, one she thought too much for him;
So took she all away,
In hope that in her court, good king,
He would no longer stay.

" Am I rewarded thus," quoth he,
" In giving all I have
Unto my children, and to beg
For what I lately gave?
I'll go unto my Goneril:
My second child, I know,
Will be more kind and pitiful,
And will relieve my woe."

Full fast he hies then to her court;
Where, when she heard his moan,
Returned him answer, that she grieved
That all his means were gone.
But no way could relieve his wants;
Yet, if that he would stay
Within her kitchen, he should have
What scullions gave away.

When he had heard with bitter tears,
He made his answer then;
" In what I did, let me be made
Example to all men.
I will return again," quoth he,
" Unto my Regan's court;
She will not use me thus, I hope,
But in a kinder sort."

Where, when he came, she gave command
To drive him thence away;
When he was well within her court
(She said) he would not stay.

Then back to Goneril,
The woeful king did hie,
That in her kitchen he might have
What scullion boys set by.

But there of that he was denied,
Which she had promised late:
For once refusing, he should not
Come after to her gate.
Thus 'twixt his daughters, for relief
He wandered up and down;
Being glad to feed on beggar's food,
That lately wore a crown.

And calling to remembrance then
His youngest daughter's words,
That said the duty of a child
Was all that love affords;
But doubting to repair to her,
Whom he had banished so,
Grew frantic mad; for in his mind
He bore the wounds of woe:

Which made him rend his milk-white locks
And tresses from his head,
And all with blood bestain his cheeks,
With age and honour spread.
To hills and woods and watery founts
He made his hourly moan,
Till hills and woods and senseless things
Did seem to sigh and groan.

Even thus possessed with discontents,
He passéd o'er to France,
In hopes from fair Cordelia there,
To find some gentler chance;
Most virtuous dame! which when she heard
Of this her father's grief,
As duty bound, she quickly sent
Him comfort and relief.

And by a train of noble peers,
In brave and gallant sort,
She gave in charge he should be brought
To Aganippus' court;
Whose royal king, with noble mind,
So freely gave consent,
To muster up his knights at arms,
To fame and courage bent.

And so to England came with speed,
To repossess King Lear,
And drive his daughters from their thrones
By his Cordelia dear.
Where she, true-hearted, noble queen,
Was in the battle slain:
Yet he, good king, in his old days,
Possessed his crown again.

But when he heard Cordelia's death,
Who died indeed for love
Of her dear father, in whose cause
She did this battle move:
He swooning fell upon her breast,
From whence he never parted;
But on her bosom left his life,
That was so truly hearted.

The lords and nobles when they saw
The end of these events,
The other sisters unto death
They doomed by consents;
And being dead, their crowns they left
Unto the next of kin;
Thus have you seen the fall of pride,
And disobedient sin.

ON FIRST LOOKING INTO CHAPMAN'S HOMER

MUCH have I travell'd in the realms of gold
And many goodly states and kingdoms seen,
Round many western islands have I been,
Which bards in fealty to Apollo hold.

Oft of one wide expanse had I been told
That deep-brow'd Homer ruled as his demesne:
Yet did I never breathe its pure serene
Till I heard Chapman speak out loud and bold:
—Then felt I like some watcher of the skies
When a new planet swims into his ken;
Or like stout Cortez—when with eagle eyes
He stared at the Pacific, and all his men
Look'd at each other with a wild surmise—
Silent, upon a peak in Darien.

—JOHN KEATS.

LINCOLN, THE MAN OF THE PEOPLE*

WHEN the Norn Mother saw the Whirlwind Hour
Greatening and darkening as it hurried on,
She left the Heaven of Heroes and came down
To make a man to meet the mortal need.
She took the tried clay of the common road—
Clay warm yet with the genial heat of Earth,
Dashed through it all a strain of prophecy;
Tempered the heap with thrill of human tears;
Then mixed a laughter with the serious stuff.
Into the shape she breathed a flame to light
That tender, tragic, ever-changing face.
Here was a man to hold against the world,
A man to match the mountains and the sea.

The colour of the ground was in him, the red earth;
The smack and tang of elemental things:
The rectitude and patience of the cliff;
The good will of the rain that loves all leaves;
The friendly welcome of the wayside well;
The courage of the bird that dares the sea;
The gladness of the wind that shakes the corn;
The pity of the snow that hides all scars;
The secrecy of streams that make their way
Beneath the mountain to the rifted rock;
Tolerance and equity of light
That gives as freely to the shrinking flower
As to the great oak flaring to the wind—
To the grave's low hill as to the Matterhorn
That shoulders out the sky.

Sprung from the West,
The strength of virgin forests braced his mind,
The hush of spacious prairies stilled his soul.
Up from log cabin to the Capitol,
One fire was on his spirit, one resolve—
To send the keen axe to the root of wrong,
Clearing a free way for the feet of God.
And evermore he burned to do his deed
With the fine stroke and gesture of a king:
He built the rail-pile as he built the State,
Pouring his splendid strength through every blow,
The conscience of him testing every stroke,
To make his deed the measure of a man.

So came the Captain with the mighty heart;
And when the judgment thunders split the house,
Wrenching the rafters from their ancient rest,
He held the ridgepole up, and spiked again
The rafters of the Home. He held his place—
Held the long purpose like a growing tree—
Held on through blame and faltered not at praise.
And when he fell in whirlwind, he went down
As when a lordly cedar, green with boughs,
Goes down with a great shout upon the hills,
And leaves a lonesome place against the sky.

* Published by The Grolier Society by permission of Edwin Markham.

HAIL, COLUMBIA

This national song, written in 1798, was composed to inspire patriotism. The author, Joseph Hopkinson, was the son of one of the signers of the Declaration of Independence.

HAIL, Columbia! happy land!
Hail, ye heroes! heaven-born band!
Who fought and bled in Freedom's cause,
Who fought and bled in Freedom's cause,
And when the storm of war was gone,
Enjoyed the peace your valour won;
Let independence be your boast,
Ever mindful what it cost,
Ever grateful for the prize,
Let its altar reach the skies.

CHORUS.

Firm united let us be,
Rallying round our liberty,
As a band of brothers joined,
Peace and safety we shall find.

Immortal patriots, rise once more,
Defend your rights, defend your shore;
Let no rude foe with impious hand,
Let no rude foe with impious hand,
Invade the shrine where sacred lies
Of toil and blood the well-earned prize;
While offering peace, sincere and just,
In Heaven we place a manly trust
That truth and justice may prevail,
And every scheme of bondage fail.—*Cho.*

Behold the chief who now commands,
Once more to serve his country stands!
The rock on which the storm was beat!
The rock on which the storm was beat!
But armed in virtue, firm and true,
His hopes are fixed on heaven and you.
When hope was sinking in dismay,
When gloom obscured Columbia's day,
His steady mind, from changes free,
Resolves on death or liberty.—*Cho.*

MOTHER'S WORLD

This pretty little poem of a mother's love for her children was written by Margaret H. Alden, a Canadian poet.

EYES of blue and hair of gold,
Cheeks all brown with summer tan,
Lips that much of laughter hold,
That is mother's little Man.

Shining curls like chestnut brown,
Long-lashed eyes demure and staid,
Sweetest face in all the town,
That is mother's little Maid.

Dainty room with snow-white beds,
Where, like flowers with petals curled,
Rest in peace two dreaming heads,
That—is mother's little world!

THE TIDE RIVER

The changing nature of a great river that rises "clear and cool" among the hills and flows, ever increasing, through lovely scenes and ugly scenes, by fresh meadows and murky towns, and at length falls into the mighty ocean, is described with power and truth in this poem by Charles Kingsley.

CLEAR and cool, clear and cool,
By laughing shallow and dreaming pool;
Cool and clear, cool and clear,
By shining shingle and foaming wear.
Under the crag where the ouzel sings,
And the ivied wall where the church-bell rings,
Undefiled, for the undefiled.
Play by me, bathe in me, mother and child.
Dank and foul, dank and foul,
By the smoky town in its murky cowl.
Foul and dank, foul and dank,
By wharf, and sewer, and slimy bank.
Darker and darker the farther I go,
Baser and baser the richer I grow.
Who dare sport with the sin-defiled?
Shrink from me, turn from me, mother and child.
Strong and free, strong and free,
The floodgates are open, away to the sea.
Free and strong, free and strong,
Cleansing my streams as I hurry along
To the golden sands and the leaping bar,
And the taintless tide that awaits me afar,
As I lose myself in the infinite main,
Like a soul that has sinned and is pardoned again.
Undefiled for the undefiled,
Play by me, bathe in me, mother and child.

UNDER MY WINDOW

"Under My Window" is a quaint little poem which you will discover to be fairly rippling over with childish mischief and fun and frolic. It was written by Thomas Westwood.

UNDER my window, under my window,
All in the midsummer weather,
Three little girls, with fluttering curls,
Flit to and fro together:—
There's Bell with her bonnet of satin sheen,
And Maud with her mantle of silver-green,
And Kate with her scarlet feather.

Under my window, under my window,
Leaning stealthily over,
Merry and clear, the voice I hear,
Of each glad-hearted rover.
Ah! sly little Kate, she steals my roses,
And Maud and Bell twine wreaths and posies,
As merry as bees in clover.

Under my window, under my window,
In the blue midsummer weather,
Stealing slow, on a hushed tiptoe,
I catch them all together:—
Bell with her bonnet of satin sheen,
And Maud with her mantle of silver-green,
And Kate with the scarlet feather.

Under my window, under my window,
And off through the orchard closes;
While Maud she flouts, and Bell she pouts,
They scamper, and drop their posies;
But dear little Kate takes nought amiss,
And leaps in my arms with a loving kiss,
And I give her all my roses.

MY MOTHER'S HANDS *

Mothers, mothers, how much they do for us! How little we comprehend the enfolding wonder of their love! "There are no old mothers, there are no sad mothers, there are no tired mothers," says Maeterlinck in the new act of his play "The Blue Bird." Mothers' hands are always beautiful, and they never really grow old, says Ellen M. H. Gates.

SUCH beautiful, beautiful hands!
They're neither white nor small;
And you, I know, would scarcely think
That they were fair at all.
I've looked on hands whose form and hue
A sculptor's dream might be;
Yet are those wrinkled, aged hands
Most beautiful to me.

Such beautiful, beautiful hands!
Though heart were weary and sad,
These patient hands kept toiling on,
That the children might be glad;
I always weep, as looking back
To childhood's distant day,
I think how those hands rested not,
When mine were at their play.

Such beautiful, beautiful hands!
They're growing feeble now,
For time and pain have left their mark
On hands, and heart, and brow.
Alas! alas! the nearing time,
And the sad, sad day to me,
When 'neath the daisies, out of sight,
These hands will folded be.

But oh, beyond this shadow land,
Where all is bright and fair,
I know full well these dear old hands
Will palms of victory bear;
Where crystal streams through endless years
Flow over golden sands,
And where the old grow young again,
I'll clasp my mother's hands.

A MAN'S REQUIREMENTS

These simple lines are full of charm. They picture for us true love in many phases. They were written by Elizabeth Barrett Browning, one of the most inspired of women poets.

LOVE me, sweet, with all thou art,
Feeling, thinking, seeing;
Love me in the lightest part,
Love me in full being.

Love me with thine open youth
In its frank surrender;
With the vowing of thy mouth,
With its silence tender.

Love me with thy azure eyes,
Made for earnest granting;
Taking colour from the skies,
Can Heaven's truth be wanting?

Love me in thy gorgeous airs,
When the world has crowned thee;
Love me kneeling at thy prayers,
With the angels round thee.

Love me pure, as musers do,
Up the woodlands shady;
Love me gaily, fast and true,
As a winsome lady.

* Copyright, 1895 by Ellen M. H. Gates.



HOW GROTIUS LEFT THE CASTLE

CONTINUED FROM 2508

GROTIUS, or Hugo van Groot, to give him his Dutch name, was a famous scholar, writer, and politician, born in the reign of the great Queen Elizabeth. He spoke and wrote boldly what he thought to be right in politics and religion, and so offended the Dutch Government that they condemned him to imprisonment for life, and took away all his property. They shut him up in the castle of Louvestein, but allowed his wife to stay with him.

Now, the wife of Grotius was a clever woman, and devoted to her husband, and she set her wits working to try to find a way of escape for him. But it was not till eighteen months had passed by that a way was found which promised anything like success.

Grotius spent his time in writing, and often needed to borrow books from outside the prison to help him in his work. He got permission to borrow what books he wanted, and they were sent to him in a large trunk. As he finished with the books, he returned them to a friend outside the castle, and took the opportunity of putting into the trunk clothes which needed to be washed. The guards of the castle used to open the trunk and search it, but they never found anything more dangerous than the books and linen of the prisoner.

This went on until the guards grew tired of searching the trunk, and the keen eyes of Madame Grotius noticed how they were wearying of their duty. In a flash she saw a possibility of escape for her husband. If she could only get *him* into the trunk! First of all she made some holes in it to admit air. This being done, she persuaded her husband to sit by the fire and pretend to be ill.

On the day that the trunk had to be sent away, she helped Grotius into it, and fastened down the lid. Then, when the man came to carry away the trunk, he found the bed curtains drawn, and the wife with finger to her lips urging quiet for the sake of the invalid. The man hoisted the trunk on his shoulders, exclaiming at its weight; but he carried it away.

And so Grotius was taken to the house of a friend, and then, dressed like a miller, he got away to Antwerp.

But what of his wife, who had risked so much for her husband? At first she thought to delay discovery by dressing in her husband's clothes, and sitting crouched over the fire. But no gaoler appeared; so, allowing time for her husband to get away, she went to the guards, told them their prisoner had escaped, and scolded them for failing to do their duty. Taken aback, they let Madame Grotius walk out of the castle, and soon after she joined her husband.

THE BRAVE FRENCH MAID OF NOYON

AT a house in the little town of Noyon, in France, something had gone wrong with the drains, and workmen had to be sent down to open the drain and clean out the sewer. That is a dangerous thing to do, because of the poisonous gases that are in a sewer.

In this case, four men were busily at work when they were overcome by the sewer-gas, and were unable to give the signal to be drawn up out of the sewer.

The people in the house wondered what was the matter, and grew alarmed, but no one dared venture down.

Then a brave servant maid, a girl of seventeen, in pity for the poor men, begged to be tied to the rope and let down into the sewer.

This was done, and she reached the group of men lying helpless down below. As quickly as her trembling hands would allow her, she tied one man to the rope, and jerked it as a signal for drawing him up. Willing hands hauled up the burden, and on reaching the surface the unconscious man was still alive.

A second time the girl tied a man to the rope, and he was drawn into safety. But the next time the girl found the dangling rope come down for her to catch, she was gasping for breath. She struggled against the feeling of suffocation, and tried to fasten the third man to the rope.

This she just managed to do, but she herself would soon have been unconscious, so, with a desperate effort, she wound her long hair round the rope and tied it tightly. Then she lost consciousness; but the watchers above carefully, very carefully, pulled the double burden up into safety, just in time.

The fresh air soon revived the girl, and then she bethought her of the fourth man down in the dangerous sewer. It was hardly likely that he would still be alive; but there was a slight chance, and so again, the fourth time, this noble girl risked her life. But this time her effort was in vain, for the poor man was drawn up lifeless.

The French nation loves to reward a brave action, and some handsome gifts found their way to the unselfish maid who so cheerfully and readily risked her own life for the sake of others.

THE DEVOTION OF A ROMAN

IN ancient days the city of Rome was only one among several states in the middle of Italy, though at the time of which we are telling she was already the most powerful among them all. And because the other cities feared her power, having no mind to be made, one by one, the subjects of Rome, many of them, who were all called Latins, made a league against her. They gathered an army together and went up against the Romans, and the Roman army went out to meet them.

The Romans were under the command of two consuls, both of them known as valiant men. The one was Titus Manlius, surnamed Torquatus, because in his youth he had overcome in single combat a gigantic warrior of the Gauls who wore about his neck a collar of gold called a torque, which torque belonged to Manlius after he had slain the Gaul. And the other was Publius Decius Mus, who, when he was not yet in chief command, had saved the consul from defeat by his skill and valor. So these two men led their forces to the neighborhood of Mount Vesuvius.

Now, the old Romans believed that when men died their souls were borne away to the underworld, where the gods ruled who were called Dei Manes; and they thought that the entrance to the underworld was hard by Mount Vesuvius, where the army was now encamped. Moreover, the two consuls, Manlius and Decius, dreamed each of them the same dream, in which they beheld a mighty form, veiled, which spoke to them, saying: "If the leader of the Romans shall devote himself to the Dei Manes, the Romans will vanquish the Latins; but if the Latin leader shall devote himself, then the Latins will vanquish the Romans." Now, to devote themselves meant to die willingly for the sake of their country.

So, when Manlius and Decius met on the morrow to hold counsel, they learned how each had dreamed the same dream; and each was ready to devote himself to the gods for the sake of Rome, according to the vision. Thereupon the two agreed that when they came to battle with the Latins, each leading a wing of the army, and the Latins should get



THE BRAVE ROMAN CONSUL, DECIUS MUS, GOING TO DIE FOR THE SAKE OF ROME

the better of one wing, then the one who commanded there should devote himself to the Dei Manes, and hurling himself upon the foe, should give up his own life, and thus ensure the victory to Rome.

Now, when the Romans and the Latins were set over against each other in battle array, and the armies met in the shock of combat, it befell that, on the wing where Decius commanded, the Latins made so fierce an onset that the front ranks of the Romans were driven back upon the second line. Then Decius knew that the hour had come. Thereupon he summoned the chief of the priesthood, who was called the Pontifex Maximus, and solemnly dedicated himself for a sacrifice to the Dei Manes, according to the sacred rites of the Romans. Having girded his robes in the manner of one about to offer a victim on the altars of the gods, he rushed upon the ranks of the Latins; and the Roman historian Livy tells us that he appeared in the view of both armies as a being much more majestic than a mere man, and as one sent from heaven to help his friends and bring destruction upon their enemies. Wherever he was carried by his horse, there the Latins were seized with panic, and though Decius fell, pierced by darts, the Romans fought with fresh ardor and the Latins fled in terror all along that wing. A messenger was sent posthaste to Manlius, on the other wing, to tell him how the bidding of the vision had been accomplished, and that Decius was slain.

Men said that Manlius was sorely grieved, because, but for the compact between them, it might have been granted to him to perform the act of self-sacrifice instead of Decius. But when the Latins understood what had befallen, as well as the Romans, both Romans and Latins believed that the gods were on the Roman side, giving to them the assurance of victory, and to the Latins the assurance of defeat; and so the promise of the vision was fulfilled, and the Romans were victorious.

THE MOTHER OF THE GRACCHI

THERE was once a very gracious and beautiful lady in Rome named Cornelia. She might have married a king, but she preferred to be the wife of a Roman citizen. Her husband's name was Gracchus, and her two sons were called the Gracchi. She loved them devotedly, educated them in virtue and manliness, and trained them to be noble citizens of Rome.



CORNELIA SHOWING HER "JEWELS"

One day there came to her home a fashionable lady, who is thus described by old Robert Burton: "Some light housewife belike, that was dressed like a May lady, and, as most of our gentlewomen are, was more solicitous of her head-tire than of her health, that spent her time between a comb and a glass, and had rather be fair than honest (as Cato said), and have the commonwealth turned topsy-turvy than her tires marred."

This fashionable companion lady "did nought but brag of her fine robes and jewels," and the noble Cornelia listened with patience, because she was hostess to the other, and showed nothing of the disdain she felt for the poor frivolous creature.

But presently the grand lady said to Cornelia: "You must have jewels, too. Pray show me your most precious things, for I love to look upon jewels."

Then Cornelia rose and went out of the chamber, and presently returned, leading by the hand her two manly sons. "These," said she, "are the only jewels of which I can boast."

Those sons grew to be heroic men, and all Rome knew that the mother had made them valiant and upright. In her own lifetime, a statue was raised to Cornelia, and on it was written: CORNELIA MATER GRACCHORUM, meaning CORNELIA, MOTHER OF THE GRACCHI.

To be the mother of heroic men is a great destiny. The name of Cornelia will live for ever, and her famous sons are chiefly now remembered because they had so great and good a mother, and did credit to her training.

THE KING WHO DIVIDED HIS GOODS

A KING made a proclamation that whoever would come to him should receive whatever he cared to ask. The nobles came and asked for dukedoms and riches, and when they had been supplied, the poor people came and asked for similar gifts.

"You are too late," said the king to the poor folk. "The nobles have already had everything that I possess in this way. The only thing I have left is my power and authority as king. No one asked for this, and so I give it to you, that you may be the judges and masters of these rich nobles.

When the wealthy men heard what the king had done, they came imploring that he would withdraw such a gift.

"We cannot have these wretches to rule over us," they said.

"I do you no wrong," replied the king. "You had what you asked for, and took, as you thought, everything, so that there should be nothing left for the poor. Divide what you have with them, and I will resume my power."

The nobles felt that this was the best thing they could do, and so the poor received a share and were made comfortable.

THE NEXT GOLDEN DEEDS BEGIN ON PAGE 2813.

THE STORIES OF CHARLES DICKENS

WE have already seen that Dickens often wrote his stories "with a purpose." Just as "Oliver Twist" did a great deal to expose the ill-treatment of the pauper poor, so did "Nicholas Nickleby" expose the terrible state of boarding-school life about the time when the story was written, 1838. Indeed, it was the death-knell of all such schools as Dotheboys Hall, which only needed to be exposed in order that they might be put out of existence. In "Martin Chuzzlewit" there is not the same direct purpose; there the great author is only concerned with the study of interesting characters and the development of an entertaining story.

NICHOLAS NICKLEBY

CONTINUED FROM 2568

IN the earlier part of last century the private schools of England were very unlike those of the present day. Anybody who cared could start a school and conduct it without the least regard to the welfare of the scholars. It is hardly possible for us to realize what many of these schools were like. In Yorkshire, particularly, the worst of them were to be found. The masters and mistresses were usually ignorant, brutal tyrants, who were totally unfit to teach the boys placed under their care, and who lived by starving their pupils and thrashing them so that they were afraid to say how badly they were treated. Many of the teachers could not have written a sentence of proper English, and knew no more of grammar than their most ignorant pupils. With the splendid endowed schools of to-day and the system of inspecting private schools, the life of the boarding-school boy or girl in England is happy compared with the awful existence of torture which the young people of the earlier years of the nineteenth century had to endure. But this is only by way of introduction to the story of Nicholas Nickleby.

The hero of this great romance was not entirely a blameless and heroic young man. He was inclined to let his temper get the better of him at times, and did many things which were the result of his inexperience; but, none the less, he was at heart a good son and brother, a loyal friend, and one who tried his best to do his duty under circumstances which were often difficult and heart-breaking. His father had been a gentleman, but had lacked the common-sense and prudence which would have helped him to make the lives of his wife and children easier after he had gone; at his death he left Mrs. Nickleby and her children, Nicholas and Kate, quite unprovided for. Nicholas was about nineteen, and Kate a year or so younger; they had both been well instructed, but the youth was quite without any plan of earning a livelihood for himself, far less helping his mother and sister. Mrs. Nickleby herself was a foolish, gossiping woman, with no ability, and little was to be expected from her in the way of solving the great question of how to live. Indeed, she was largely to blame for their poverty, as she had advised her husband to speculate with the £1,000 ($5,000) which he possessed, and that had been his ruin, for he lost it all, and was so distressed at the loss that he sank into despair and died.

It was at this point that the brother of the late Mr. Nickleby, Ralph, made his appearance on the scene. He was a man who made money in the City of London in doubtful ways; a miser, unscrupulous, and altogether unlike his dead brother. Mrs. Nickleby was flattered by the visit of this person, and urged Nicholas to pay every attention to what the miserly uncle had to suggest for his welfare. Mr. Ralph Nickleby began by reading this advertisement to Nicholas.

"EDUCATION. At Mr. Wackford Squeers's Academy, Dotheboys Hall,

at the delightful village of Dotheboys, near Greta Bridge, in Yorkshire, Youths are boarded, clothed, booked, furnished with pocket-money, provided with all necessaries, instructed in all languages, living and dead, mathematics, orthography, geometry, astronomy, trigonometry, the use of the globes, algebra, single stick (if required), writing, arithmetic, fortification, and every other branch of classical literature. Terms, twenty guineas per annum. No extras, no vacations, and diet unparalleled. Mr. Squeers is in town, and attends daily, from one till four, at the Saracen's Head, Snow Hill. N.B.—An able assistant wanted. Annual salary £5. A Master of Arts would be preferred."

FIVE POUNDS A YEAR AS A START ON THE ROAD TO FORTUNE

"There!" said Ralph, folding the paper again. "Let him get that situation, and his fortune is made. If he don't like that, let him get one for himself. Without friends, money, recommendation, or knowledge of business of any kind, let him find honest employment in London which will keep him in shoe-leather, and I'll give him a thousand pounds. At least," said Mr. Ralph Nickleby, checking himself, "I would if I had it."

"If I am fortunate enough to be appointed to this post, sir," said Nicholas, doubtfully, "for which I am so imperfectly qualified, what will become of those I leave behind?"

"Your mother and sister, sir," replied Ralph, "will be provided for, in that case (not otherwise), by me, and placed in some sphere of life in which they will be able to be independent. That will be my immediate care; they will not remain as they are one week after your departure, I will undertake."

NICHOLAS BUILDS HIS CASTLES IN THE AIR AND DREAMS OF HAPPINESS

"Then," said Nicholas, starting gaily up, and wringing his uncle's hand, "I am ready to do anything you wish me. Let us try our fortune with Mr. Squeers at once; he can but refuse."

"He won't do that," said Ralph. "He will be glad to have you on my recommendation. Make yourself of use to him, and you'll rise to be a partner in the establishment in no time. Bless me, only think! If he were to die, why, your fortune's made at once."

"To be sure, I see it all," said poor Nicholas, delighted with a thousand visionary ideas that his good spirits and his inexperience were conjuring up before him. "Or suppose some young nobleman who is being educated at the Hall were to take a fancy to me, and get his father to appoint me his traveling tutor when he left, and when we came back from the Continent, procured me some handsome appointment. Eh, uncle?"

"Ah, to be sure!" sneered Ralph.

"And who knows, but when he came to see me when I was settled—as he would, of course—he might fall in love with Kate, who would be keeping my house, and—and marry her, eh, uncle? Who knows?"

What an absurdly romantic picture for a young man to build upon—the prospect of being employed by one of the most notorious of the scoundrels who kept the private boarding-schools of Yorkshire! Poor Nicholas was soon to realize how foolish were his dreams, what a ruffian he had for an uncle. But he got the post of assistant, and great was his disappointment.

HOW MR. AND MRS. SQUEERS KEPT THEIR SCHOOL AT DOTHEBOYS HALL

Mr. Wackford Squeers himself was a dirty, ugly, undersized man with one eye, and that an evil one. His whole person was enough to make any healthy boy hate him, yet many parents had foolishly let their children pass into his hands and those of his no less horrid wife, who added greatly to the misery of the scholars by the way in which she treated them. The Squeers robbed the boys of their pocket-money, stole their clothes and gave them tattered garments in their place, while their own son was dressed in the best of the stolen clothes.

Dotheboys Hall was a tumble-down place, dirty and unkempt to the last degree, the schoolroom looking as though it had never once been clean. The boys who were there were also in keeping with the place; Nicholas had never seen such a collection of half-starved, ill-treated little wretches, nor thought so many could have been got together in the one place. On certain mornings the boys were given a physic of treacle and brimstone.

"Mrs. Squeers stood at one of the desks, presiding over an immense basin of brimstone and treacle, of which delicious compound she administered a large

instalment to each boy in succession, using for the purpose a common wooden spoon, which might have been originally manufactured for some gigantic top, and which widened every young gentleman's mouth considerably, they being all obliged, under heavy corporal penalties, to take in the whole of the bowl at a gasp. In another corner, huddled together for companionship, were the little boys who had arrived on the preceding night, three of them in very large leather breeches, and two in old trousers, a something tighter fit than drawers are usually worn; at no great distance from these was seated the juvenile son and heir of Mr. Squeers, a very striking likeness of his father, kicking, with great vigor, under the hands of Smike, who was fitting upon him a pair of new boots that bore a most suspicious resemblance to those which the least of the little boys had worn on the journey down—as the little boy himself seemed to think, for he was regarding the appropriation with a look of most rueful amazement. Besides these, there was a long row of boys waiting, with countenances of no pleasant anticipation, to be treacled; and another file, who had just escaped from the infliction, making a variety of wry mouths indicative of anything but satisfaction. The whole were attired in such motley, ill-sorted, extraordinary garments as would have been irresistibly ridiculous, but for the foul appearance of dirt, disorder, and disease with which they were associated."



Brimstone-and-treacle morning at Dotheboys Hall.

We can imagine after this how sad was the heart of simple Nicholas, who knew nothing of the life that was lived outside the quiet circle of his own old home. He was horrified by all he saw at Dotheboys Hall, and most of all by the inhuman way in which poor Smike, a half-witted lad, was treated by the Squeers. Smike clung to Nicholas as a protector, and when at length Nicholas determined to go away and leave the hateful place, poor Smike ran away from the school to follow him.

Perhaps the fact that Fanny Squeers, the daughter of his master, had fallen in love with him, and did everything to make him uncomfortable when he refused to fall in love with her, was another good reason for Nicholas betaking himself far away from Dotheboys. What was Nicholas now to do? He had broken his promise to his uncle, and could not look to him for help. On leaving London, he had received a letter from one Newman Noggs, a poor clerk in Ralph Nickleby's office, telling him, if he ever needed help, to come to him at a certain address.

Poor Newman had once been a gentleman "with horses and hounds," but had acted foolishly, lost his money, and was now reduced to the unpleasant work of serving the miserly Nickleby in the City of London. At length Nicholas went to him, and through Newman he became tutor to the four quaint little daughters of the Kenwigs, with their hair in two straight plaits, tied at the ends with bright ribbons.

A fine employment for a young gentleman; the salary five shillings a week! But we cannot follow Nicholas in all his adventures, which were the outcome of his ignorance of the world. He became an actor for a time in the company of Mr. Vincent Crummles, an eccentric but kind-hearted theatrical manager, and poor Smike—who turns out to be the cousin of Nicholas, and son of Ralph Nickleby—was also employed by Crummles, though Nicholas found him a hopeless pupil.

Meanwhile, Ralph Nickleby had been trying in vain to get Kate to become friendly to Lord Verisopht, to carry out an evil scheme of his, and the Squeers

were conducting Dotheboys on the old lines. At length Nicholas fell in with the Cheeryble Brothers, two old gentlemen who were rich merchants, but had once been poor boys.

THE CHEERYBLE BROTHERS HELP NICHOLAS TO MAKE A FORTUNE

It was their whole delight to do good and charitable acts, and Nicholas became their clerk, and eventually a partner in their firm. His fortune is now certain, and out of many trials happiness is coming, not only for Nicholas but for several others, while punishment will be meted out to those who deserve it.

Another miserly old man, in some ways like Ralph Nickleby, but not so great a villain, would have his daughter Madeline, a lovely and affectionate girl, marry a man she hates; but he dies of heart trouble before he can force her to the wedding, and she is free to marry Nicholas, whom she loves, while Ralph Nickleby loses his money in the end, and hangs himself, all his efforts to induce his niece Kate to think of the stupid Lord Verisopht having been in vain, and Kate is reserved for the happier fate of becoming the wife of Frank Cheeryble, the nephew of the kind merchants who made the fortune of Nicholas. Newman Noggs, too, is happy and comfortable in his old age, for, having prevented a scheme of Ralph Nickleby's to swindle the Cheeryble Brothers, those gentlemen proved their gratitude by providing for him.

There are many other characters in this famous story, and we should be delighted if we could follow their history here; but it is impossible. The fate of Dotheboys, however, must be mentioned. For the villainous Squeers at last brought himself within the clutches of the law by stealing an important document, and was sentenced to be transported. When news of this reached the school, it was the signal for a rebellion.

"It was one of the brimstone-and-treacle mornings, and Mrs. Squeers had entered school, according to custom, with the large bowl and spoon, followed by Miss Squeers and the amiable Wackford, who, during his father's absence, had taken upon himself such minor branches of the executive as kicking the pupils with his nailed boots, pulling the hair of some of the smaller boys, pinching the others in aggravating places, and rendering himself in various similar ways a great comfort and happiness to his mother. Their entrance, whether by premeditation or a simultaneous impulse, was the signal of revolt.

THE SCHOOL AT DOTHEBOYS HALL BREAKS UP FOR EVER

"While one detachment rushed to the door and locked it, and another mounted the desks and forms, the stoutest (and consequently the newest) boy seized the cane, and, confronting Mrs. Squeers with a stern countenance, snatched off her cap and beaver-bonnet, put it on his own head, armed himself with the wooden spoon, and bade her, on pain of death, go down upon her knees and take a dose directly. Before that estimable lady could recover herself, or offer the slightest retaliation, she was forced into a kneeling posture by a crowd of shouting tormentors, and compelled to swallow a spoonful of the odious mixture, rendered more than usually savoury by the immersion in the bowl of Master Wackford's head, whose ducking was entrusted to another rebel. The success of this first achievement prompted the malicious crowd, whose faces were



THE TABLES TURNED ON MRS. SQUEERS
The boys make her take her own brimstone and treacle.

clustered together in every variety of lank and half-starved ugliness, to farther acts of outrage. The leader was insisting upon Mrs. Squeers repeating her dose, Master Squeers was undergoing another dip in the treacle, and a violent assault had been commenced on Miss Squeers, when John Browdie, bursting open the door with a vigorous kick, rushed to the rescue. The shouts, screams, groans, hoots, and clapping of hands suddenly ceased, and a dead silence ensued."

John Browdie, was a fine, old-fashioned Yorkshire grain-dealer, who knew of the state of things at Dotheboys from having befriended poor Smike when he ran away to join Nicholas. Mr. Browdie quelled the riot, but told the scholars to leave the hateful place, which they did without more ado, and Dotheboys Hall broke up for ever.

THE STORY OF MARTIN CHUZZLEWIT

IN a little Wiltshire village near Salisbury there used to stand a comfortable inn, the Blue Dragon, owned by a very comely, plump, and dimpled widow named Mrs. Lupin. She had "roses on her ample skirts, and roses on her bodice, roses in her cap, roses on her lips," bright black eyes, and jet-black hair. A charming, cheery picture indeed! The night before our story begins there had come to her inn an old man, and with him was a very pretty girl of about seventeen years. Mrs. Lupin was naturally curious, and could not understand how these two were related; they were not father and daughter, and could not be husband and wife. Now, this gentleman was old Martin Chuzzlewit, and he had a very peculiar character. He had adopted Mary Graham, an orphan, and, although he gave her an annual allowance, he had vowed to leave her without a single penny when he died. He was very rich and, as you will see, very eccentric. He had been troubled so greatly by poor relations, who professed to be his friends on account of his money, that he determined that before he died he would have his revenge on them for their greed. Martin Chuzzlewit had been traveling, and had come to the Blue Dragon to rest for a time because of ill-health. Close by lived one of his relatives—the one he hated most of all!

MR. PECKSNIFF, THE HYPOCRITE, AND HOW HE MADE HIS LIVING

The name of this person was Seth Pecksniff, an architect—a man who was regarded by all the villagers as one of the best and saintliest of men. He wore his iron-grey hair brushed off his forehead and standing bolt upright; his eyelids were heavy, and his manner was soft and oily. His wife was dead, but he was not a lonely man, for he had two daughters, Charity and Mercy, or, as he called them, Cherry and Merry. The elder was very prim and stiff; the younger one very kittenish and playful. Mr. Pecksniff called himself an "architect and land surveyor," but nobody ever knew of any house he had built, or of any land he had surveyed, except that which he could see from his own windows. You might wonder, then, how he made any money, but it was made by his having pupils to whom he taught architecture. They lodged with him, and usually they left before long, calling him dreadful names and hating him very much; but he would cast his eyes up to the ceiling and look greatly hurt at such treatment. The one person who admired him through all was his timid, good-hearted assistant, Tom Pinch.

YOUNG MARTIN CHUZZLEWIT BECOMES THE PUPIL OF MR. PECKSNIFF

Mr. Pecksniff expected a new pupil, and he was rather alarmed that he should happen to be a Martin Chuzzlewit, the grandson of the visitor at the inn. He sent Tom Pinch to Salisbury to meet him and bring him home, and Tom was delighted at the thought of his driving to town; it was quite like an adventure, and he was proud of his importance. He was too simple-hearted to notice any selfishness in Martin desiring the whole of the fire for himself, or that he was obliged to sit in the trap with the new pupil's trunk under his feet, so that he could see scarcely anything but his knees. Mr. Pecksniff and his daughters welcomed Martin to the house, and overwhelmed poor Tom with attentions which embarrassed him; he was not used to much kindness, but as he believed no ill of anyone in the world, perhaps that did not matter.

Before young Martin had time to settle down thoroughly in his new home,

Mr. Pecksniff found that he would have to go to London on important business; so he left the two young men in charge of the house, taking with him his two fond daughters. They had been in London for a day or so, when Mr. Pecksniff was summoned on his business, which seemed to be very secret.

Now, we must know that when old Martin had been at the Blue Dragon he had an interview with Mr. Pecksniff, in which he told that hypocrite a few unpleasant truths about himself. It was he who now wished to meet him in London.

OLD MARTIN BEGINS HIS LITTLE PLOT TO UNMASK MR. PECKSNIFF

When Mr. Pecksniff went to see old Martin, he took with him Merry and Cherry, who were, of course, charmed to know the old man, and greatly delighted at a proposed new arrangement between the cousins. Old Martin, it now appeared, wished to board with the Pecksniffs in their house, and, of course, Mary Graham must come too. But first he explained that his grandson must go, as he was very angry with him for having fallen in love with Mary.

Before returning to their home, the Pecksniffs visited some other cousins, one of whom, Jonas Chuzzlewit, fell in love with Merry. This Jonas was one of the most hateful of men imaginable, grasping and cruel, and was always reproaching his poor old father because he did not die and leave his money to him! When Mr. Pecksniff was home again he spoke to Tom Pinch, but would not even glance at his pupil. This so enraged the haughty, self-willed young man that he knocked Mr. Pecksniff down, and left his house for ever. But, you see, the wily "architect" had got rid of him.

YOUNG MARTIN AND MARK TAPLEY SEEK THEIR FORTUNES IN AMERICA

There was only one thing now for Martin to do, he thought, and that was to go abroad and make his fortune. So he bade his sweet Mary farewell, and sailed for New York. Mary gave him a valuable diamond ring, which he took, thinking it was from his grandfather; he did not consider others sufficiently to know that she had bought it with her own savings in case he should ever be in want. With him there went an ostler of the Blue Dragon, named Mark Tapley, who adored Mrs. Lupin, and left her employment simply because she was so good to him, and he was so happy there that he thought there was no credit in his being contented. What he wanted was a situation which would make anyone else miserable, and in such a place he would strive to keep "jolly." When he had known young Martin for only a little time, he could see that gentleman had a good deal of selfishness in him, and concluded that here was the very unpromising sort of master to whom he should act as servant.

In New York they went to an office to find out a place which would be suitable for an architect, and spent all their money in buying some land on an island with the pleasant name of Eden. They went by steamboat to this place, but, when they were once landed, there was no means of getting away again! The people of the island were all half-starved skeletons, their houses broken-down hovels, and their own abode a miserable log-cabin. Before long Martin was struck down with fever, and Mark nursed him tenderly, and also did all that he could to help his poor neighbours. Here, at last, he could take credit for being "jolly"—the word which his poor lips strove to frame when he, in his turn, was attacked by the fever, and Martin had to nurse him.

YOUNG MARTIN BECOMES A BETTER MAN THROUGH SUFFERING

To Martin it was not without its benefit, this stern discipline of pain; for whilst he and Mark were recovering, Martin had plenty of time to think of his past life with regret, and to resolve that if he were spared in the future he would show himself to be a changed man; indeed, he almost disappointed Mark, who felt there would soon be no credit in being jolly with such a good master and friend!

But we must turn our thoughts back to the old village in Wiltshire again, where Tom Pinch was never so happy as when he was playing on the church organ, and Mary Graham would steal in quietly and slip out again without his taking any notice of her presence, in case his observing her should frighten her away. One day Mr. Pecksniff came softly into the church, unseen, and fell asleep in a pew. When he wakened he heard Tom and Mary talking about him, and he listened to their conversation.

Mary revealed to him Mr. Pecksniff in his true character—how he was a mean, hypocritical, designing man, and how he had proposed marriage to her so that he might gain his own selfish ends. Tom was deeply in love, in his simple, unselfish way, with Mary, and when he knew of this proposal he understood he had been deceived for years in his master. When Mr. Pecksniff reached home, fearing Tom would disclose his knowledge, he discharged him in a way that made it appear he was doing something very painful to himself, but which was the only righteous course for him under the circumstances.

TOM PINCH AND HIS SISTER ARE HELPED IN LONDON BY AN UNKNOWN FRIEND

Going to London, poor Tom met an old friend of his, John Westlock, a former pupil of Pecksniff's, and before long some employment was given to him in such a mysterious way that he did not know who might be his employer, but only that his salary was so good that it enabled him to set up housekeeping for himself with his pretty sister, Ruth, who had been badly treated by some rich people to whose daughter she was governess. But now a sad thing happened to Merry Pecksniff. Although she was the daughter of a deceitful man, she had some good feeling left in her young heart, and many foolish ideas too. She foolishly married her cousin Jonas, whom she rightly disliked, for the sake of spiting her sister Cherry, to whom he had first made love.

The old father of Jonas had died, and Jonas now became friendly with some men who had a large office in the City, seemed very wealthy, and made him feel very proud of himself when they told everyone of his cleverness.

WHAT HAPPENED TO THE WICKED JONAS CHUZZLEWIT

But these flatterers soon robbed Jonas of his hoardings, for he was not so clever as he thought. He had long ago shown his cruelty towards his pretty, silly young wife—he had even struck her—but now his passion at the thought of his lost money knew no bounds. He followed the man who had been the chief cause of his losing his wealth, and in a dark wood he killed him, leaving his body hid amongst the leaves. The murder was discovered, the murderer tracked, and Jonas was guarded in his room until a coach should come to take him to gaol. Bribing the man who watched him with a promise of one hundred pounds, he was allowed five minutes in another room. When the coach arrived he entered, and was driven off; but before the gaol was reached he had freed himself from the power of man, and in his dead hand he held a bottle of poison. Thus poor Merry was left the widow of a murderer. It was also proved that Jonas had tried to poison his father, who had seen through his plan and avoided it. The knowledge of his son's guilt broke the old man's heart, but Jonas himself believed that he had really poisoned him.

But all life is not sorrow, and where trouble comes to those who have been happy, it also happens that good fortune comes to those who have passed through many trials. Young Martin came home again from America with the jolly ostler, who resolved that it would be best to marry Mrs. Lupin and be jolly with her; and the name of the inn was changed to the Jolly Tapley.

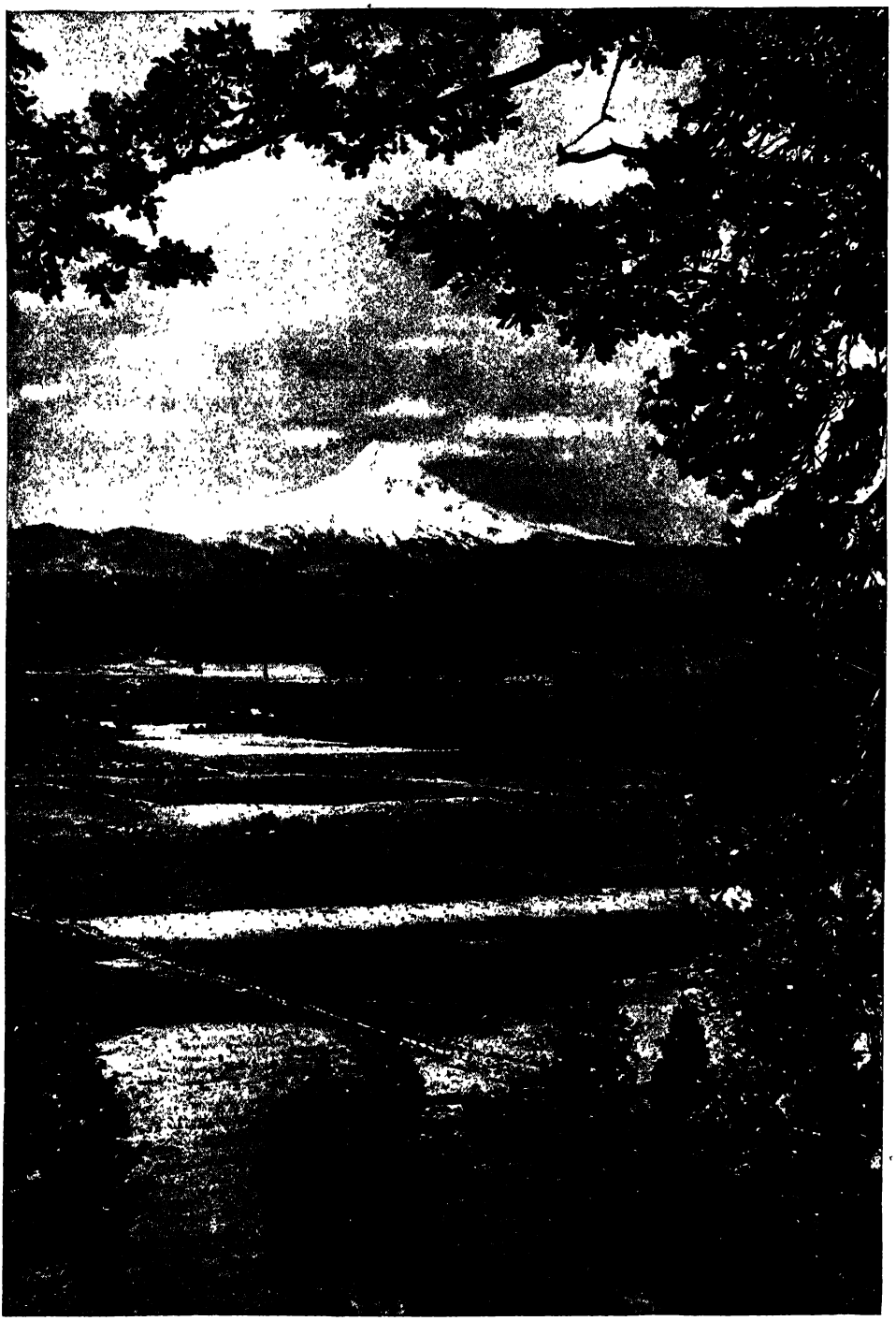
PECKSNIFF IS PUNISHED AND OLD MARTIN MAKES EVERYBODY ELSE HAPPY

Old Martin Chuzzlewit now summoned to him his grandson, Mark, Tom Pinch, Ruth, Tom's old friend, Westlock, and Mr. Pecksniff. Before the whole assembly he told them of his purpose in staying at the house of such a man. He had watched everything that had been done, scarcely able to control himself at times; had pretended friendship for the horrid Pecksniff; but at last he had come to the end of his endurance. He now rose from his chair, and with his stick he felled Pecksniff to the ground; while all stood around, amazed at the old man's anger. From that day Pecksniff put away all pretence of being a good man, and, with his daughter Cherry, fell to begging money from people.

Old Martin Chuzzlewit forgave his grandson freely for all his wilful conduct in the past, and gladly consented to his marriage with Mary. He also told them that he had been Tom's patron, giving him his pleasant situation in London. And now his kindness extended farther, and in his new goodness of heart he strove to console poor Merry for her sorrows, and to show her that she might yet have some happiness in life.

THE NEXT STORIES OF FAMOUS BOOKS ARE ON 2773.

A PICTURE OF NATURE'S FRAMING



This is the peaceful valley of the Hood River in Oregon with snow-covered Mount Hood in the distance. This mountain is in Wasco County and has a height of more than 11,000 feet. The melting snow from its top and sides feeds many streams. Hood River, which gives the valley its name, is one of them. Every year many climb over the glaciers to its summit to enjoy the magnificent view.



A Great Oil Refinery in San Francisco.

THE UNITED NATION

PART II

CONTINUED FROM 2387

IN our last story of our country we told of recent events, and then went on to describe some of the things which our country produces. We spoke of what we may call the vegetable products. Now let us go on to speak of the animal and mineral products. We shall also tell what we make of all their products.

First let us speak of the animals. You have roast beef, or steak, for dinner sometimes, and you know the animal that furnishes them. Perhaps, if you live in the country or in a small town, you have a cow or several cows in the barn, and you know that farmers raise cattle for the butcher. But where does the meat for the great cities come from?

You have perhaps read of the great cattle ranches of the West. There were many of them a few years ago and they included thousands of acres. In other sections were millions of acres of government land over which cattle ranged, living out of doors all winter.

As the population has increased much of this land has been needed for farms, and the great ranches are being broken up. So many cattle can no longer get their living by grazing all the year, but must be fed a part of the time. Though the population increases every year, the number of cattle increases very little, or not at all. Every year beef is becoming higher in price, and it is not likely to be much lower. Texas has the greatest number of cattle.

AMERICAN MEAT SOLD IN EVERY LAND

Nevertheless the United States is still a beef-producing country. We send thousands of animals to Europe alive, though not so many as we did years ago. In some of the western cities are packing houses where the animals are slaughtered and prepared for market. The meat is stored in cold rooms, and when cold is carried in cold cars all over the United States, and may be put in cold rooms on ships and sent all over the world. Many million pounds are also sent in cans.

The humble hog, however, furnishes a larger value than any other animal. Hogs are raised everywhere in the United States, but the largest number may be found in the Mississippi Valley, which also produces the most corn. Iowa raises the largest number, with Illinois and Missouri next. Our country stands at the head of the producers of pork and pork products.

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In nearly every state sheep are raised both for food and for their wool, but the greatest number are in western states, as Wyoming and Montana, though Ohio has a large number. In the production of wool our country ranks third in most years. Australia is first, the Argentine Republic is second, and Russia probably fourth, though we know very little about Russian agriculture now. We cannot send any wool abroad but must buy in great quantities in order to get enough to clothe our people.

POULTRY AND EGGS FORM A VALUABLE PRODUCT

You would hardly believe that poultry and eggs are among the most valuable products of our country. Yet it is estimated that two hundred eggs are used in this country, every year, for every man, woman and child. Together poultry and eggs are worth hundreds of millions of dollars every year. The prices change so often that it is difficult to say exactly how much. Illinois usually has the most chickens, but Ohio produced the most eggs at the last census. We produce just about enough for ourselves and have few eggs to send away.

The same is true of butter and cheese though we do send away a little cheese. The value of these two articles of food is more than $500,000,000 a year. Of course, the value of the milk sold in our towns and cities is many millions more. Some of this, you know, is put into cans and sent abroad.

While the sea is not precisely the United States, yet the food gotten from the water is a part of our national wealth. The value of the fish caught by our fishermen is one-sixth to one-fifth of that of the whole world, and we send away great quantities of salmon, which are nowhere else so plentiful as on the western coast of North America. We produce more than four-fifths of all the oysters eaten in the world, and no other oysters are so good.

In order to be certain that the fish will not be caught faster than there are new ones to take their places, the government has built fish hatcheries at many different places. Here the eggs are hatched, and after the little fish are large enough to take care of themselves, they are turned loose in the streams and in the sea. You have learned in another place how some fish eat the eggs of other fish.

THE AMERICAN MULE PULLS WAGONS IN AFRICA

We also raise more horses and mules than we need and these are sent to Europe and even to Africa and Asia. The mule eats less than a horse and will keep strong on coarse, rough food on which a horse would starve. During the South African War, thousands of American mules were bought by the British to pull the artillery and the supply wagons. During the Great War many thousands more went.

MINERAL PRODUCTS OF THE UNITED STATES

Now we come to the third great class of products, which belongs to the mineral kingdom. In minerals the United States is very rich. In fact the value of our production is almost equal to that of all the rest of the world put together, though this will not be true when the great stores of Russia, China and Canada are really opened. Mineral products are divided into metals and non-metals.

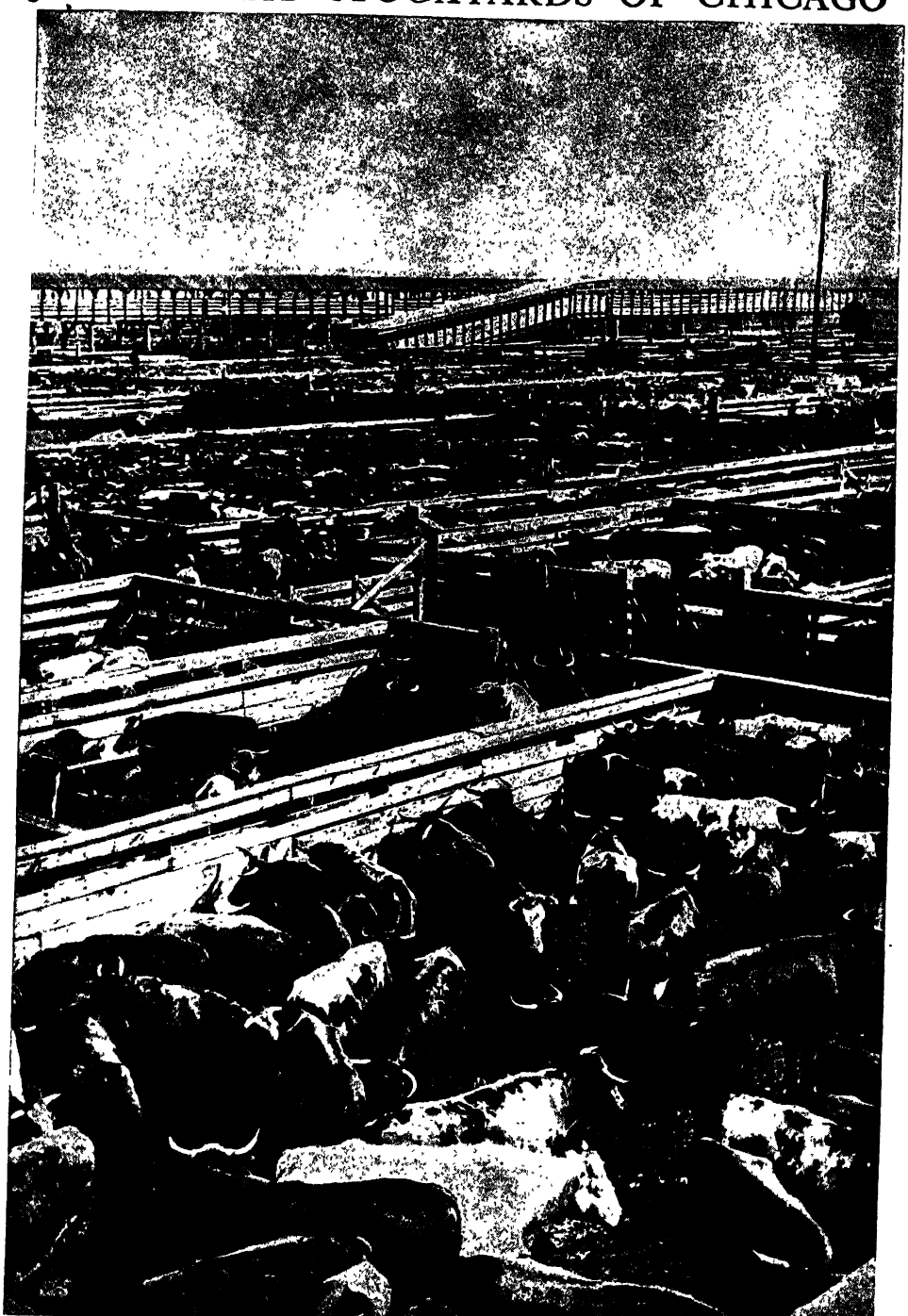
The most valuable of all our metals both in usefulness and in money is iron. Our country furnishes from one-third to two-fifths of the iron of the world, and more than one-third of the steel, which is made from iron. We shall tell you more of how iron is gotten from the ore and how it is then turned into steel in another place. Three states, Minnesota, Michigan and Alabama, furnish most, though some is found in twenty-five states.

OUR COPPER WORTH MORE THAN OUR GOLD

Next in value to iron is copper and of this we furnish about half of the world's supply. Copper is used for many things, but perhaps the most important use is as a conductor of electricity. Nearly all the wires you see over which electricity passes are of copper, and it is also used in electrical machines. It is necessary in making weapons of war. Much of it is also used to cover wooden ships, as it is strong for its weight and the water does not affect it very much. Arizona, Montana and Michigan furnish the most.

Next in value is gold, of which we furnish about one-fifth of all mined in the world. South Africa is first, of course, and then comes our country. California, Colorado and Alaska lead in the order named, and with Nevada and South Dakota, supply about five-sixths of all we produce. Some gold is obtained in about thirty states.

THE GREAT STOCKYARDS OF CHICAGO



Chicago is the world's greatest stock market. It is a huge, wealthy Illinois city on Lake Michigan, and cattle from a thousand miles around are sent to its great stockyards, one corner of which is shown in this picture. These stockyards, or markets, cover 574 acres of ground and give employment to 1,800 workpeople. Many thousands of men and women are employed in the meat industry in Chicago, the most important centre of this trade in the whole world. In the year 1830 Chicago had only a few houses; now it has about two and a half million people.

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TWO METALS WHICH ARE USUALLY FOUND TOGETHER

The next two metals are almost equal in total value and are almost always found together. These are silver and lead, but in most years the silver is worth a little more than the lead. Generally we produce about one-fourth of the silver of the world, which puts us in second place, with Mexico first. On account of the revolutions in Mexico, production has fallen off, and recently the United States has furnished more than any other country. Montana, Nevada and Utah are almost together, with Idaho not far behind, among our states in the production of this beautiful metal, which has so many uses that you can name.

Lead is used for many purposes, both pure and when mixed with some other metals. Water-pipes and tanks, electric batteries and bullets are all made of lead. When mixed with tin it makes solder, with which the plumber stops the leak in the pipes; mixed with another metal, called antimony, it forms the type metal from which this book is printed. We produce more than any other country—nearly one-third of the yearly supply. Spain, the German Empire and Mexico also furnish large quantities of this metal. In our country, Missouri, Idaho, Utah and Colorado are the leading states.

A METAL THAT IS SELDOM USED ALONE

Zinc is used to cover iron to prevent it from rusting, making what is called galvanized iron. Mixed with copper, it makes brass, which is very useful. Much is also used in the manufacture of paint, in electric batteries and in dyeing. We produce about one-third of the world's supply.

Perhaps you have seen a white metal something like silver but much lighter in weight, called aluminum. This metal is never found pure, but it is one of the most abundant elements in the earth's crust. Most clays contain it, and in combination with other substances it forms beautiful gems in the earth. An American discovered a cheap way of separating it from the substances with which it is combined, and now we produce about half that is used. This metal is likely to be much more freely used in the future, as there is much more of it in the earth than there is of iron, and the price is going down.

The only other important metal is quicksilver or mercury, which you see in thermometers, and which is also used in medicine and in gold mining. More than one-seventh of the supply comes from the United States, nearly all of it from California.

SOME MINERALS THAT ARE NOT METALS

Many things which are minerals are not metals. The most important of these is coal, of which we produce between one-third and one-half of all that is mined, or almost as much as Great Britain and the German Empire together. These three produce most of the coal used, though in Russia and China there are great beds which are hardly worked at all.

Two kinds of coal are mined, anthracite, or hard coal, and bituminous, or soft coal. Pennsylvania furnishes nearly all the anthracite, though Colorado and New Mexico have a little, and also furnishes more bituminous than any other state. West Virginia and Illinois are next, though coal is mined in thirty states.

Next in value is petroleum, of which we furnish much more than any other country, with Russia second. Besides kerosene, gasoline, vaseline and paraffin, many other valuable products are obtained from this oil. It is found in California, Oklahoma, Illinois, Texas, Louisiana, West Virginia, Pennsylvania, Ohio and several other states. Along with oil is almost always found natural gas, for which wells are bored just as they are for oil. Many cities and towns in the United States are lighted and warmed by this fuel, which is conveyed by pipes like ordinary gas. In another place we tell you more of how this great help to mankind is produced.

BUILDING STONE OF MANY KINDS IS NEXT IN VALUE

Next in value of our minerals is building stone. Some sort is found almost everywhere, and we have some of the best and most beautiful stones in the world. Marble, the limestones, the sandstones, and granite are the ones chiefly used, and many different colors and degrees of hardness are to be found among them.

Vermont furnishes more marble than any other state, though Georgia and Tennessee also have much beautiful stone of many colors. Nearly every state has some limestone but the quarries of Indiana, Illinois and Kentucky are the most

STOCK-RAISING IN NEW MEXICO



Some parts of New Mexico are becoming noted for fine stock. Indeed it would be difficult to find anywhere better specimens than those shown on this page. The state now stands third in the United States in the production of wool, and some enthusiastic residents say that it will yet rank higher.



This is a part of a herd of thoroughbred Holsteins kept for dairy purposes near Roswell, New Mexico. This breed is one of the best for the purpose as it gives large quantities of good milk even if it is not so rich as that of the Jersey. The silo is beside the shed under which some of the cattle are standing.



The value of the hogs raised in the United States is greater than that of any other animal. These are Berkshires, one of the most popular breeds in both America and England, and are only four months old. When a year old they will be much larger. Notice the saucy curl of their tails as they devote themselves to their food. Hogs are able to get much of their food by grazing, just as cattle and sheep do.

noted. Sandstone is found almost everywhere. Many states have quarries of excellent granite.

TWO MORE VALUABLE MINERALS THAT ARE NOT METALS

Salt is produced all over the world and though the United States makes more than any other nation,—about one-fourth,—we do not have enough for our needs. You are told about the production of salt on page 237.

Glass, about which you are told on page 1263, is, you know, only melted sand. No other country makes so much as we do, for nowhere else are there so many people who can afford to buy glassware for their tables, and to use so much glass in their windows.

SOME OTHER MINERALS FOUND IN OUR COUNTRY

There are dozens of other useful minerals found in the United States. Phosphate rock, used for fertilizer, is valuable, and so is sulphur. Grindstones are worth many thousands of dollars, borax is valuable, and so is mica, much used for stove windows, and other purposes as well. We must not forget the rock from which cement is made, for this grows more valuable every year.

We must acknowledge that Nature has been kind to our country. No other country has such a variety of soil on which so many different kinds of crops can be raised. In no other country do so many animals thrive, and no other country is so rich in mineral wealth. If the United States were shut off from all the rest of the world, it would not make very much difference. We would have to do without some things, but they would not be the most important. The necessities of food, clothing and shelter are all produced. Some tropical products would be lacking, of course.

WHAT DO WE MEAN BY RAW MATERIALS?

It is usual to speak of most of the things of which you have been told above as food products and as raw materials for manufacturing. For example, cotton is the raw material and cloth is a finished product. Iron ore is a raw material, steel rails for a railroad are a finished product. Of course, however, you must remember that the finished product of one factory may be raw material for another. Cloth, for example, is the raw material for a tailor, and flour for a baker.

The United States has become the greatest manufacturing country in the world because it has the greatest stock of raw materials, and because it has cheap coal and much water power. You must remember that power is necessary to run machines, and no matter how much raw material a country has, it cannot become a manufacturing country unless it can get some sort of power to run its machines, and has also a cheap way of carrying raw material to the factories and of taking away the finished goods.

You have already been told of the coal supply of our country, and that it has many swiftly running streams. These streams are made to furnish power by means of water-wheels. Because New England had so many of these streams is one reason why manufacturing developed early in that section.

HOW THE STREAMS HAVE BEEN HARNESSED

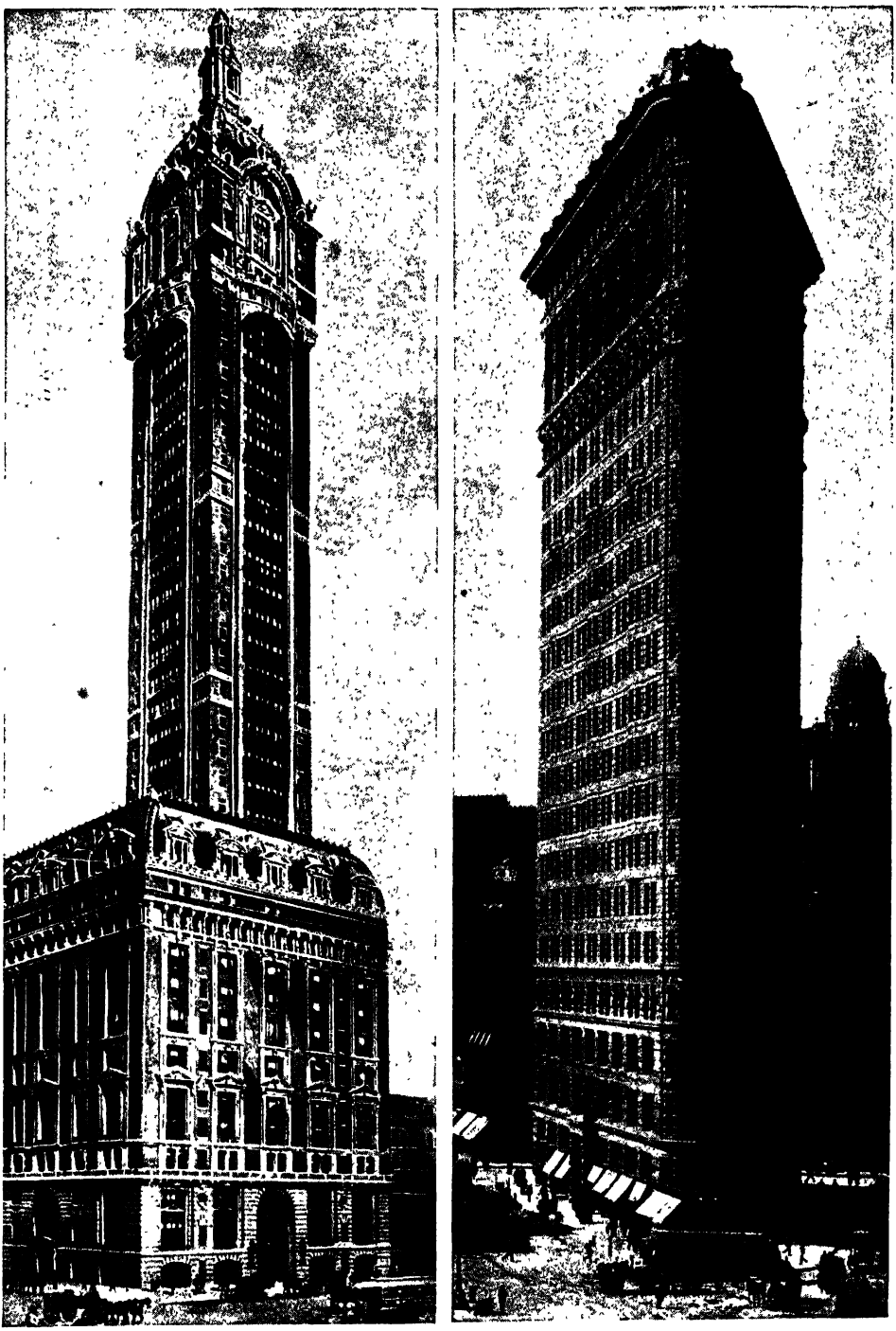
Lately there has been a great increase in the use of electric power. On many streams, great dynamos to develop electric power have been built. The power is then carried by wires ten, twenty, fifty miles away to the factories, which must be built where there are railroads to carry the goods, or where there is a good supply of labor. In many factories, instead of great engines to run the machines you will see only an innocent looking wire running into one corner of the building. And yet this wire carries more power than any number of great engines can develop.

HOW LABOR AND SKILL ADD TO SELLING PRICE

Labor and skill add very much to the value of some kinds of raw material. For example, a lump or scoopful of iron ore costs almost nothing. If made into pig iron it is worth a little more; made into a stove it is worth still more; made into steel for railway rails the value increases still more. The same amount of material made into knife blades is worth a great deal, and then if made into springs for watches, say, is worth many hundreds of dollars.

A pound of raw cotton costs only a few cents. When made into coarse thread the value is increased, and when this thread is woven into cloth the value becomes greater still. Or if the cotton is spun into fine thread and then made into lace, the value may be a thousand times as much as that of the raw cotton.

TWO OF THE WORLD'S HIGHEST BUILDINGS



These are two of New York's famous tall buildings. On the left is the Singer building, about forty stories high, much taller than any cathedral spire in this country. The other is a corner building which Americans have aptly termed the "flat-iron," because the front of it is narrow and the back broad. In some of these buildings as many as 10,000 people work, and the crowds going in and out make the place look like a railway station. There are stairs to the top, and elevators running all day and sometimes all night, some of them "expresses," going without stopping from the street floor to the twelfth, sixteenth, or twentieth story.

OTHER RAW MATERIALS NOT MUCH INCREASED IN VALUE

Some other raw materials are not increased so much in value because not so much labor and skill is spent upon them. A loaf of bread does not cost so much more than the wheat out of which it was made, but even here fine pastry and cakes are sold for much higher prices.

The United States was, at first, as you have been told, almost entirely an agricultural country, but since your fathers were born, it has become also the greatest manufacturing country in the world in the value of products.

We do not yet make the finest goods of every kind, for some of them require very highly skilled labor which requires a long time to train, but every year finer and finer goods are made. In some lines we already surpass any other country, while in others we make only the coarser grades. On some goods you have seen foreign names, or perhaps "Made in Germany." Sometimes these goods have been sold in this country because of quality and sometimes because of cheapness.

THE MOST VALUABLE MANUFACTURES OF THE UNITED STATES

Of all the manufactures of the country those of the greatest value are the food products. These are flour, meal and meat prepared for use, and similar things. They are important because without them we could not live. Minneapolis is the chief centre of the flour, and Chicago of the meat industry.

The next group to be mentioned is that of iron and steel and their products. The chief single item in this group is steel rails for railroads, either steam or electric. We make all our railroads need, and in far away parts of the world you will find engines running on American rails. Pennsylvania is the chief state in such manufacture.

Much of the steel sent abroad goes in the form of electrical and agricultural machinery. Our country is the chief maker of all sorts of farming machinery, about which you may learn in another article. Some of the steel goes into the making of ships though we are not the greatest ship-building country.

Lumber and timber products are very valuable. A large part of agricultural machinery, tools and implements is made of wood. The same is true of horse-drawn vehicles. Motor cars are nearly all metal. Street and railway cars are sometimes made of wood, though metal is being used more and more. Furniture must not be forgotten. In fact the wood products are almost numberless.

CLOTH AND CLOTHING OF MANY KINDS

The next group of our manufactures is the textiles, which means, that which is woven. We may divide this group into wool, cotton, silk and linen. Then besides there are other classes made up of a combination of these. Our woolen manufactures are large, but we send very little abroad, as we need most of our production for our own people. In fact we must buy much raw wool and much cloth also in other countries. Besides cloth there are carpets, stockings and knit underwear, and the like.

We make more knit goods than all of the rest of the world put together, and we make more carpets than any other country. More knit goods are made in New York State than in any other, while in carpets, Philadelphia holds first place. Taking all kinds of woolen goods together, Massachusetts is the first state.

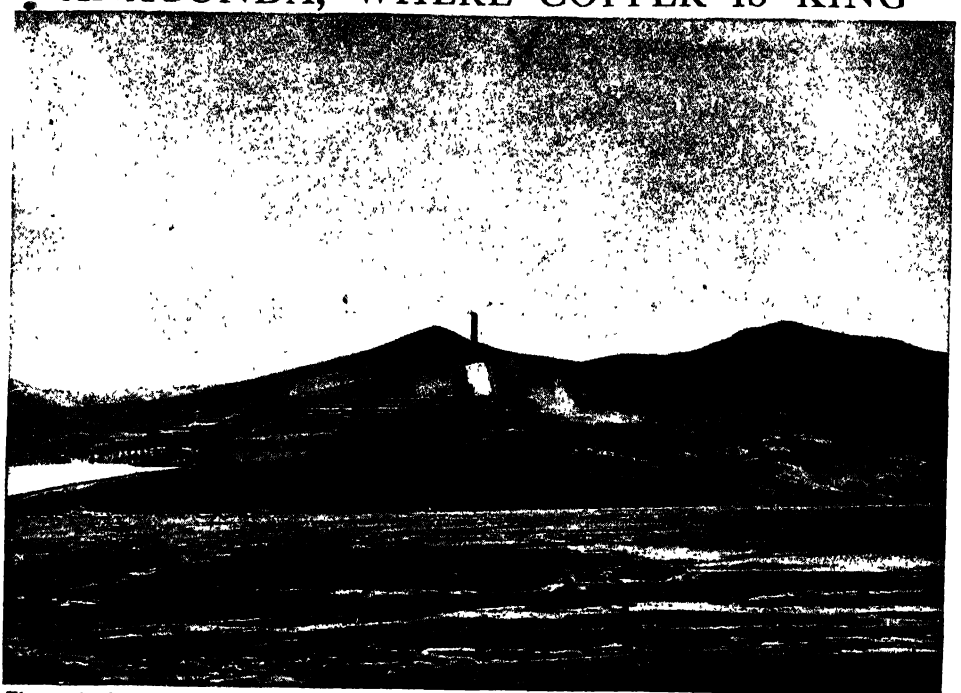
We manufacture much cotton goods though we do not use as much as half our crop of the raw cotton. This industry is almost entirely confined to the Atlantic states. The first cotton mill was built in Massachusetts about 1790, and for many years nearly all the mills were in New England. For about thirty years the number of mills in the South has been increasing, and now there are hundreds of mills in the Southern states and they use more cotton than the Northern.

Massachusetts is still the chief state, with North Carolina and South Carolina struggling for the second place, and Rhode Island is fourth. New Hampshire, Georgia and Alabama also manufacture much cotton. We send much cotton cloth to other countries, and some day will probably manufacture a much larger share of our cotton.

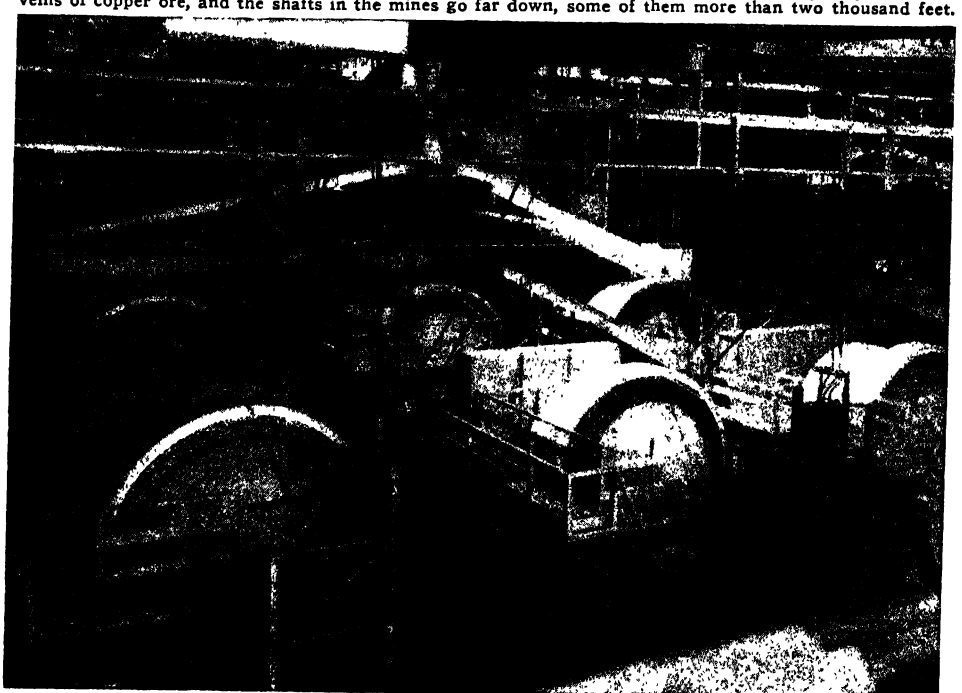
OUR SILK AND OUR LINEN MANUFACTURES

Our country uses about one-third of the raw silk of the world, but still we do not manufacture all we need. Nearly all the raw silk used is imported. Though many attempts to raise silkworms in this country have been made for nearly two hundred years, they have not been very successful. No other country uses so

ANACONDA, WHERE COPPER IS KING



The works for smelting copper ore at Anaconda, Montana, are the largest in the world, and the Washoe Reduction Works, which are shown here, produce about one-tenth of the world's supply. The town of Anaconda has grown up around the copper industry. In the mountains around are many large and rich veins of copper ore, and the shafts in the mines go far down, some of them more than two thousand feet.



Copper is not often found entirely pure, and may be reduced by several methods. This is the concentrator floor in the great establishment shown above. When finely crushed ore is placed in oily or acid liquids some of the impurities are separated. The "concentrate" must then go through other processes. Pictures by courtesy of Anaconda Copper Mining Company.

much silk as the United States, because no other people can afford to buy so much. The leading state in silk manufacture is New Jersey, with Pennsylvania next. The city of Paterson, in New Jersey, is one of the chief silk manufacturing cities in the world.

Though we grow very little flax for spinning, we bring in a great deal to be woven into cloth. The best linens are not made in the United States, however, but we make a great deal of linen crash for towels, besides much linen thread. Some cotton is often mixed with flax and sometimes the product is sold by dishonest merchants as pure linen. Ireland, Holland and France are the great linen countries.

More treasures which were once thrown away

Next in value is the group known as chemicals, drugs and dyes. This includes fertilizers of many kinds, which furnish food for plant life. They are made from such things as phosphate rock, ground bones, potash, cottonseed meal, and the refuse from slaughter-houses and fisheries. Medicines are made from our native plants or from plants imported from other countries; and many kinds of dyes are also made. We told you in a former volume how the cotton seed was once thrown away. Around gas works and oil refineries only a few years ago there was such a great quantity of a sort of tar left after the gas and oils had been taken out, that it was in the way. Chemists have found in this ugly black substance more hidden treasures. Some of the most valuable medicines used by our doctors are now gotten from it, as well as brilliant dyes. The value is many million dollars, from a substance thought almost worthless.

Paper and printing, an important industry

The next of our manufactures in value is paper, or at least paper and printing. When you think of the number of newspapers, magazines and books, the amount of wrapping paper used by the butcher, the grocer and other tradesmen, to say nothing of the number of paper bags used every year, you can easily see how it happens that the value is so great. Then, also, there is paper for writing. Besides, too, there are hundreds of other uses for paper, of which you have probably never heard. Most paper is made wholly or partly of wood pulp. The finest paper is made from rags, but many other fibres are used. The United States produces as much paper as all the rest of the world.

Now we come to leather, as the prepared skins of animals are called. When the skin is removed it soon becomes dry and hard, so hard that it cannot be used for shoes or other purposes. So it must go through many processes to make it soft. We cannot stop to tell how this is done now. The chief animals, the skins of which are used, are cattle, sheep, hogs, goats and horses. We make very little horse or goat leather in this country. In all we make nearly a third of the world's leather, and use up not only the skins of animals obtained in this country, but many from abroad.

The number of carriages, wagons and automobiles is very large and the value is very great, but a part of this value is in the wood and steel already spoken of. Though making motor cars, both for pleasure and business, is a new industry, it has grown very rapidly, and now is one of the largest in the country. Tobacco, too, sells for many millions of dollars. We grow not quite half of all grown in the world. Of this half is used here and half sent to other countries.

There are many other things manufactured in this country which we have not space to mention. Nearly every little town in the states east of the Mississippi has one or more mills or factories of some sort, and there are many in the states west of the great river.

Curious things which the census shows us

We learn some curious things if we study the long columns of figures that are sent out from the Census Office in Washington. We find that New York State makes ninety-nine out of every hundred collars and cuffs made in this country; that Connecticut makes about sixty-five out of every hundred clocks, and more than half of the brassware.

Massachusetts makes over half of the boots and shoes, while New York is the centre of the clothing industry, both for men and women. This state made almost nine times as much clothing for women, and almost three times as much for men as any other state, when the last census was taken. Michigan leads all other states in making motor cars. Some-

WORK AND PLAY IN THE FAR WEST



Gathering oranges in a grove like this near the beautiful city of Los Angeles, California, can hardly be considered work at all. You can see blossoms as well as ripe fruit on the trees. The men pick each orange separately so that when a box is packed there will be no bruised specimen. Los Angeles is surrounded by orange and lemon groves, and by fruit gardens, and ships large quantities of all of them.



Though Seattle is one of the busiest cities on the Pacific, the people have not forgotten the need of recreation. The city has a complete park system of nearly 2,000 acres, connected by boulevards, besides many playgrounds. Few cities have done more than Seattle for the general welfare of the whole population. This is Volunteer Park.

Picture by courtesy of Chamber of Commerce, Seattle.

times a state leads because of nearness to the raw material used in an industry. Sometimes the reason seems to be that the first factories built in the state, were successful, and other men were encouraged to build. Factories were built in New England years ago, because there was so much power furnished by the streams.

Now when we learn that a country does much manufacturing, we know that it must have easy ways of getting raw material, and of sending away what its factories make. In Holland you were told that more goods are carried by canal boat than by railway. In many other countries a very large part of all the freight is carried by river or canal.

THE RAILWAYS OF THE UNITED STATES

Though the United States has many rivers, not very much use is made of them as the railroad is quicker. Many canals were dug before the Civil War, but some of them have been allowed to fall into disuse or fill up. Some have been dug recently. Several important canals are in operation, however. The most important is the Erie Canal, of which we have spoken elsewhere, and the Lake Washington Canal at Seattle. About two-fifths of all the miles of railroad in the world are in the United States. The number of miles is more than 250,000.

Some of these railroads run from the Atlantic to the Pacific under one management. You can go from New York to New Orleans without changing cars. The passenger cars on these trains have every convenience and one can go from New York to San Francisco in less time and with less fatigue than the journey from New York to Boston required a hundred years ago. No other people travel so much. If all the distances traveled by passengers in the United States were divided equally it would amount to a journey of three hundred and fifty miles a year for every one of us.

Nearly all the railways use steam locomotives, but some are turning to electricity. In another place we show you some great electric locomotives. There are many light railways which use motors built into the cars, like the street cars or like the elevated or underground railways in our cities. In some parts of the country electric railroads connect the cities and small towns.

WHO ARE THE PEOPLE OF THE UNITED STATES

From the first settlement of the United States there has been more work than there have been workers. In the earliest days, when land was free to all, few people would work on the farms of others when with a little trouble they could get farms of their own. After the Revolution all the unoccupied land became the property of the government, and you have been told how possession of the land beyond the Mississippi was gained.

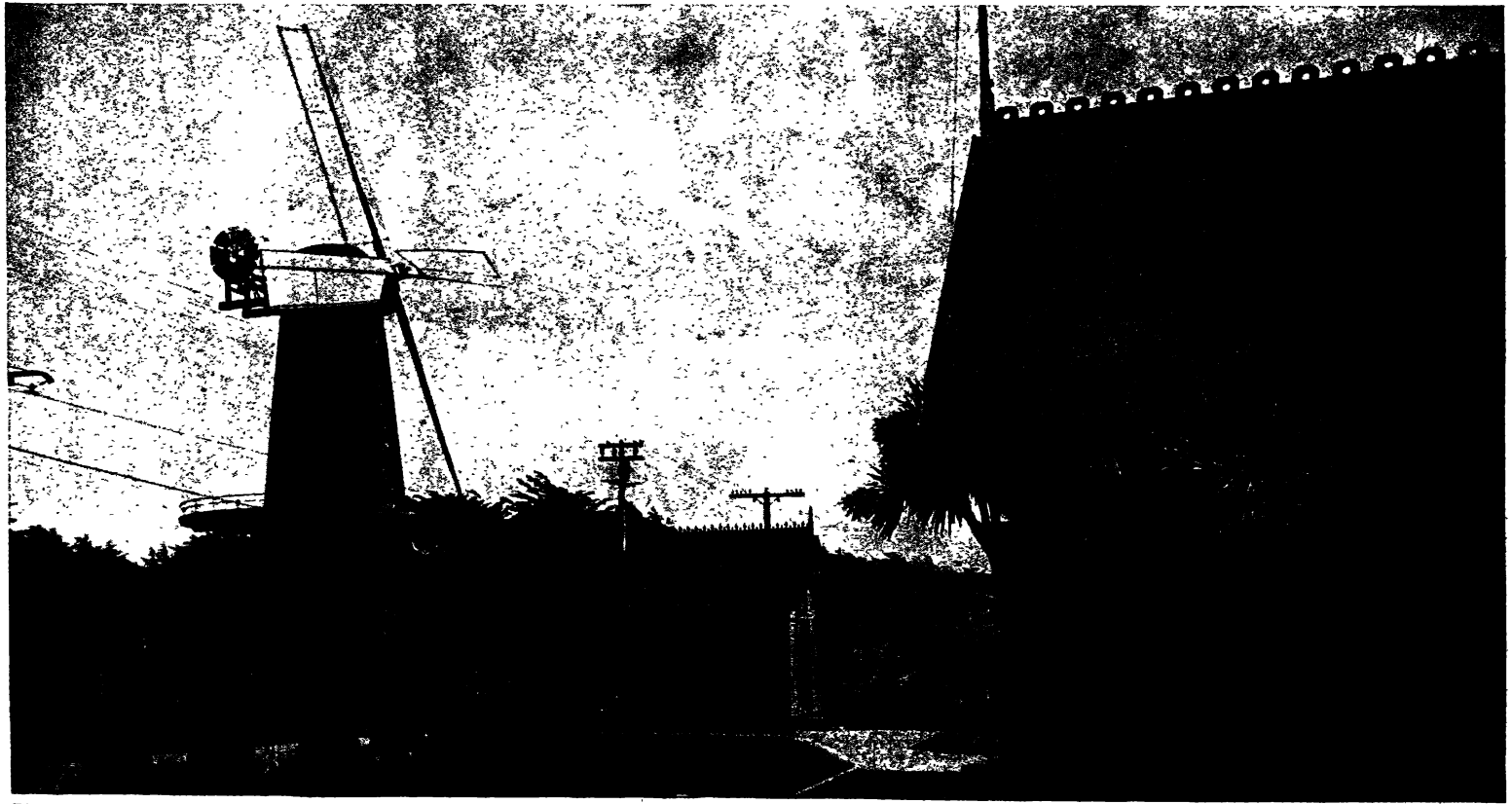
This land was first sold at a very low price to settlers and later the government gave a farm of 160 acres to every man who would work it. Many millions of acres were given away, and now there are fertile farms and thriving towns and cities where there were no inhabitants only a few years ago. The free land is not quite all gone yet.

Now what of the people of our country? You were told in another volume that besides the English, some Scotch, Irish, French, Germans, Swiss and Swedes came to this country before the Revolution. For a time after the Revolution very few foreigners came, but after 1830 the number became larger, but not so many as 100,000 came any year until 1842. Until 1860, nearly all who came were from Great Britain, Ireland and Germany. Since the Civil War the number has increased very greatly. Not so many now come from Great Britain, Ireland, Germany, Norway and Sweden or any other countries of Northern Europe. Many came from Canada before 1895, but fewer come now.

Now the immigrants come from Central or Southern Europe. Russia, Austria-Hungary and Italy furnish the largest numbers. Some come to escape persecution, some to improve their condition, some to avoid military service. Some come intending to spend their lives, while others expect to work a little while, save their money and go back to their native land. Most of them come first to New York, and as they enter the harbor one of the first things they see is the great statue of Liberty with her torch upraised, as a sign that here in this land every one has a chance to make of himself as much as he can.

They are of many races and speak many different languages. They have not been used to free government and many

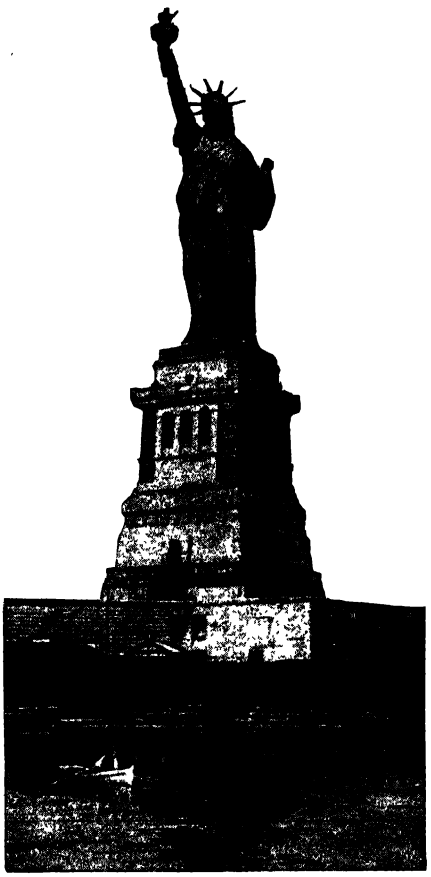
GOLDEN GATE PARK, THE LARGEST IN SAN FRANCISCO



The west entrance of Golden Gate Park, San Francisco, is near the sea. Much of the park, which contains over a thousand acres, was once only sand dunes. It now contains fields for baseball and other sports, a playground for children, a stadium, a zoological garden, an art museum, beautiful walks and drives besides an amazing variety of trees, shrubs and flowers. There are several of these great windmills, which pump water to supply the lakes in the park. There is a beautiful view of the water from the park. In another place we have shown you the sun setting on the Golden Gate. Other scenes in San Francisco are also shown.

of them are very poor. They are willing to work, however, and to do the kinds of hard and dirty work which the native-born American does not like to do.

Their children go to the public schools, learn to speak English, and many of them



THE STATUE OF LIBERTY

On a little island in the middle of the harbor in front of New York towers this magnificent Statue of Liberty, over 300 feet high, greeting the visitor to the United States. The statue itself is 150 feet in height, and was presented to the United States by the French nation in commemoration of the 100th anniversary of the Declaration of Independence, and to show how much they admired the freedom of the American nation. It is made of copper and iron, and the torch held aloft is lighted at night by electricity.

go on to high school and college. In New York City are many large merchants and manufacturers who came to this country poor immigrant boys.

Some well-known doctors and lawyers are the sons of parents who never learned to speak English well. In Europe they would not have had the opportunity to become educated, but would have been compelled to remain laborers for small wages all their lives. This country allows every boy or girl to rise as high as his or her ability and industry will permit.

You have learned something of what the American has done in the past in the History of Our Land. In other parts of our book we tell you of the famous writers, inventors, painters and sculptors, and so shall not stop to speak of them here. But no mention of America is complete without speaking of the American's belief in education. No other country spends so much money on its schools. In every state of the Union are public schools open free for every child, and many states offer a high school besides. Some states, and even a few cities, support free colleges and universities for their young men and young women.

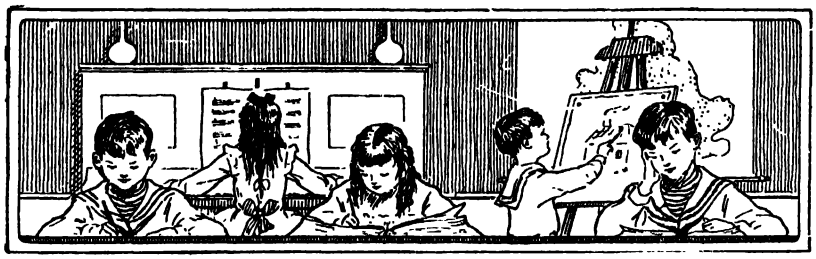
Where the colleges and universities are not supported by the state, rich men have given many millions of dollars for buildings and to pay the salaries of the professors. These wonderful gifts astonish the European, for nowhere else have men of wealth been so liberal. They have also given large sums to establish public libraries, build art galleries and museums, and to found institutions to study scientific and social subjects.

THINGS IN WHICH OUR COUNTRY IS NOT FIRST

As I look back over this article, I fear that it sounds boastful. Perhaps it is, for I have preferred to tell you of the things in which our country has been most successful. But there are other things in which we are not at the head of the world. In music, art and literature we are not yet in the first rank. In obedience to the law and respect for the rights of others, many nations surpass us. Our politics are not always clean. We can only hope that as the years go on we shall improve, and every one of us should do his part to make our country a better place in which to live.

Some one has called America "the melting-pot of the world." By this he meant that in our country people of different races, different languages, different religions, and different ideas of life, are living here together, and out of all the confusion will some day come the future American. Just what he will be like no one can say. He is certain to be unlike the American of the earlier days.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 3219.



READING

THE WORDS THAT DESCRIBE THINGS

CONTINUED FROM 2376

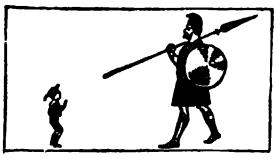
SO far in these lessons we have only had words that are the names of persons or things: words like CAT, DOG, LION, SPIDER, SHEPHERD, BABY, and many more besides. But this is not the only kind of word that is used in our language. Supposing you were to see a little negro baby, what would you say?



Oh, what a BLACK baby!

And if you could by any chance see Goliath walking down the street (only you never will, of course), you would call out:

Oh, what a TALL man!



When Jack Horner was sitting in that corner of his, greedily eating his pie, he said (but it was not true):



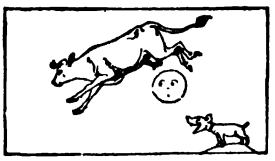
What a GOOD boy am I!

He was not good at all; he was really very selfish.

Now, these three words, BLACK, TALL, GOOD, are not names of persons or things, but they tell us something about persons and things. If we want to be very clever and learned, we shall call these words Adjectives; and we shall call the words that are names of persons and things Nouns. A noun simply means a name, and an adjective means some word added to a name. Try to answer these questions, and the answer will in all these cases be an adjective.

What was the dog that laughed when the cow jumped over the moon?

LITTLE



What was the Simon called who met the pie-man?



SIMPLE

How many little negro boys were there at first?

TEN



But there is still something more to learn about the words we call adjectives.

Supposing you have a little baby brother who is just beginning to toddle about the nursery. As you hold his hand and help him along, you look down at him and he looks up at you. So, if you were thinking about his height and your height, you would say :

I am TALLER than baby.



But supposing you had *two* little brothers, and you were all three standing in a row, each trying to make himself look as big as possible ; then, if mother were measuring the height of each one of you, she would say (we will call your name Harry) :

" Harry is the TALLEST of the three." So we see that we can alter the word TALL, and sometimes make it into TALLER, and sometimes into TALLEST.

Again, if we had two apples, one large and the other SMALL, a greedy boy would at once put out his hand and snatch the big one, saying to himself :

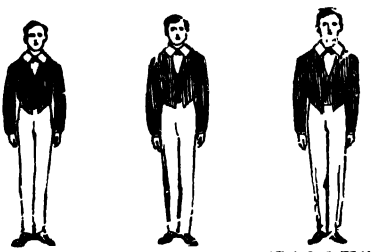
" The other apple is SMALLER than this one."

But if I had seen him do that, I should have made him put it back. Then I should have pulled out a lot of apples from my pocket, and said :

" You shall have the SMALLEST of them all." So we have :

TALL	TALLER	TALLEST
SMALL	SMALLER	SMALLEST

We use the words in the middle column when we have only *two* things or persons, and measure one by the other ; and we use the words in the last column when we compare one person or thing with *two or more*.



TALL TALLER TALLEST

This is what is called the comparison of adjectives.

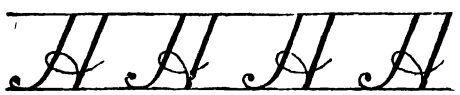
WRITING

FIVE NEW CAPITAL LETTERS

" WELL, Nora, do you remember P, B, and R ? " asked her mother, when they had their next writing lesson.

" Oh, yes ; and Tom makes them so nicely, mother. Look," replied Nora, as she showed her mother some letters which they had been making.

" Very good, Tom," said his mother encouragingly. " Now you are ready for some new letters. The first one is H ; watch me as I make it."



" You see it has two long down-strokes. The first curves round to the left and ends in a curl, and the second makes a loop over to the first down-stroke, and ends in a curve to the right."

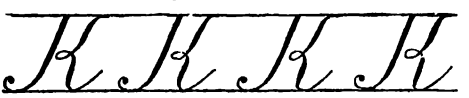
" Two posts like the swing in the garden," said Tom.

" But no ropes hanging down or seat," said Nora. " The rope is only looped round the posts at the sides."

" Be careful to keep the two posts the same distance apart," warned their mother ; " and, Tom, the loop should be larger than the one you are making."

Tom tried again, and then he and Nora were shown a letter very like H.

" This is K," said their mother, as she finished making the first one. " How is it like H, do you think ? "



Tom thought the first part was like the left post of H, and told his mother, with a twinkle in his eye, that it had a loop like R, and finished like it.

" See, mother," he said, as he turned over his papers of letters to find R.

" It is in two pieces like H," said Nora.

" You are both right," their mother

replied. "But notice how the second stroke of K curves inwards towards the other, before it makes the loop."

Tom thought this loop would do for the seat of the swing, but Nora thought it was still too high up.

"H and K are much alike, and the next two letters are also much like each other, and easy to make," said their mother, as she wrote the first for them to copy. "This is T."



"That looks so easy," said Nora. "What a funny way to begin! The pencil seems as though it wanted to take a walk before starting in earnest."

"And that little walk," added her mother, "makes it different from another letter, so we must remember T has a turn to start with, then a down-stroke like the first part of H and K, and ends in a curl a little to the left.

"T's turn," said Tom to himself, as he copied his mother's letter; "that will help in remembering it." He was just finishing his line of T's, when he thought of the T-square, and said, "Mother, what about the T-square?"

His mother remembered the talk about the T-square and big T, and she showed him how to make the capital T like a T-square with a straight down-stroke and another stroke across it at the top, like this:

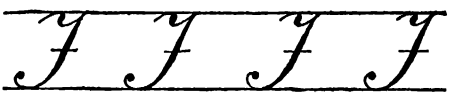


"Many people make capital T like that, so it is necessary you should know how to make both kinds of T."

Nora had seen a signpost with two arms pointing in different directions, where two roads met, and she said that T reminded her of it.

"Does any other letter make a turn first, mother?" she asked.

"Only one," she replied, as she took a pencil to write the next letter, F:



"Like T cut in halves!" exclaimed Nora. "For the only difference is that little stroke across the middle."

F was no trouble at all to make, for, as Tom said, all you had to do was to make T, and cross it like little t.

ARITHMETIC

THE WAY TO MULTIPLY NUMBERS

LET us see now how we are to make use of the multiplication tables which we learned in our last lesson. Suppose we have a question of this sort: "Jack had 32 marbles, and he bought 32 more. How many will he have altogether?" We can, of course, find the answer by adding together 32 and 32, and the work would look like this:

32
32
—
64

But, with the help of the table which we made in the last lesson, we do the work in a different way. We wish to find what *two* times 32 makes; so we write 32, and under the unit's figure we write 2.

32 Then say, twice 2 are 4. Put
2 down 4 (in the unit's place).
— Twice 3 are 6. Put down 6
64 (in the "ten's" place).

In many examples we have to "carry" a number, exactly as we do in addition. In fact, we should always remember that "multiplication" is only a convenient way of doing addition when all the numbers to be added together are the same.

If there are 67 houses on each side of a street, how many are there on the two sides together?

We have to find out how much twice 67 makes.

67 In the same way as before
2 write 2 under the unit's figure
— of 67. Then say, twice 7 are
134 14. Put down 4, carry 1. Twice 6 are 12, and 1, 13. Put down 13.

So there are 134 houses—that is, one hundred and thirty-four.

Since the numbers 32 and 67 consist of only 2 figures each, we have almost as much to write when we work these

examples by the help of our tables as we do if we simply add together 32 and 32, or 67 and 67. But, if the numbers are large, then the new way of working gives us much less to write than the old; while, if we have to use the "3 times" table, we have much less to write, whether the number is large or small.

There are 365 days in a year. How many days are there in three years?

	Put the 3 under the unit's
365	figure of 365. Say, 3 times 5
3	are 15. Put down 5, carry
——	1. 3 times 6 are 18, and 1, 19.
1095	Put down 9, carry 1. 3 times
	3 are 9, and 1, 10. Put down 10.

If we could not use our tables, our working would be like this, which is much longer than the way we have just done:

365
365
365
——
1095

We are ready now to make the rest of our tables, up to "12 times 12." We must first write down the three columns of figures which we had at the end of our last lesson.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

You will remember that the second column contained the numbers which we found in our "2 times" table. To get the third column we added the figures in the first two columns: 1 and 2 made 3, 2 and 4 made 6, and so on. This gave us our "3 times" table.

To get the "4 times" table we must add the figures in the first column to the figures in the third column: 1 and 3 make 4, 2 and 6 make 8, 3 and 9 make 12, and so on. The fourth column will then consist of the numbers 4, 8, 12, 16, 20, etc. These must be the numbers we want for our "4 times" table, because we have added the figures 1, 2, 3, 4, etc., to "3 times" those same figures. Clearly, this must give us "4 times" the figures 1, 2, 3, 4, etc. In learning the table we say to ourselves: "4 times 1 are 4, 4 times 2 are 8, 4 times 3 are 12," and so on.

The "5 times" table is obtained in the same sort of way. Add the figures in the first column to the figures in the fourth column, and we get 5, 10, 15, 20, etc., for our "5 times" table.

Then by adding the first column to the fifth we get "6 times." Going on in this way, always adding the first column to the column we have just found, we get the next table, until we reach "12 times."

We must learn these tables perfectly, so that we can say them right through without a single mistake.

MUSIC

THE GOBLINS ON LEFT SIDE OF THE FAIRIES

OUR piano fairies have many thoughts. They love to think of the dusky twilight; the rugged rocks are a joy to them; the shimmering gold of the sunshine fills their little hearts with song. Sometimes it makes them feel a little lonely, a little sad, to think they have left the home where fairies first were known. On these days they droop their wee heads, and immediately the little goblin in the small black house on their *left*-hand side knows there is something the matter; and to know that a fairy is in distress is quite too sad a thought for any little goblin.

To-day Fairy G's head is drooping, and the goblin immediately on her left-hand side asks:

"Why are you looking so sad?"

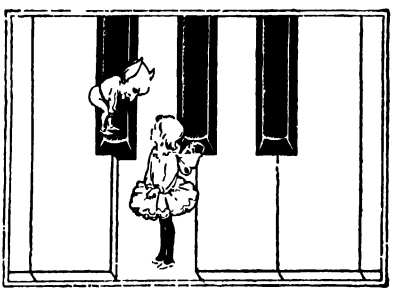
And she replies that the Spirit of the Twilight is needing her, the rocks of Fairy Glen are calling her, the golden rays of the sun are making a ladder for her, if only she will be up and away.

"But what can be done when so many people call on me?" she says sadly. "If I go, there will be no one to sing for them!"

The little goblin is quite excited, because he knows very well that he can make it possible for her to dance in the twilight, to play on the rocks, and to

run up the ladder of golden sunbeams. "Never mind, little Fairy G," we hear him say; "if you look among the many treasures your fairy godmother left you when she carried you into this land called 'earth,' you will see a funny little charm like this ♭. When a goblin carries this little emblem, he is able to sing for the fairy immediately on his right, and bear her name."

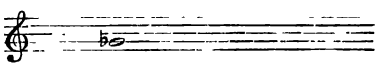
Fairy G hugs the good, kind goblin, and, hunting among her treasures, she discovers the little magic charm, which among our fairies is called a *flat*. She hands it to her wee goblin, who, as we have said, is immediately on her left, and says:



Goblin G♭

"Dear goblin, I must away. Please sing for me, and everyone shall know you, and call you little G-flat because you wear the magic charm."

The goblin is very happy; but when you press his little black note you will see that it is a little softer, a little lower, or, as fairies say, a little *flatter*, than Fairy G's voice. The small goblin is feeling just a little sad; it was so great a trouble to him to see a fairy unhappy. On this page there is a picture of little Goblin G-flat hiding behind the magic charm, as he takes up his post on Fairy G's second line in the Treble Road,

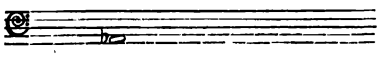




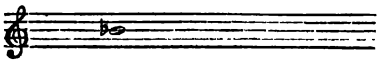
The goblins' magic charm called Flat

and if you look at all Fairy G's little homes up or down the piano you will always find on her left-hand side a little goblin to sing for her, only the song will be just a little lower and sadder—a little *flatter*.

All the other fairies have the self-same need at different times, so you will find a little goblin on the left of Fairy A, and when he produces the magic charm you will call him "little A-flat."



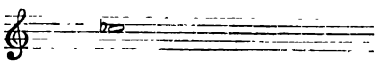
Look at all Fairy A's houses on the piano, and sure enough the helpful, kind goblin will be there. Just so will it be with Fairy B.



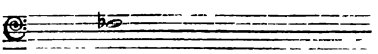
But what about Fairy C and Fairy F? Once again it means a kind little fairy coming to help. Immediately on the left of Fairy C dwells Fairy B, and that means that there is no room for a goblin's house, and poor Fairy C would feel in a great difficulty. But Fairy B cries out:

"Never mind, dear Fairy C, Twilight, Rock, and Sun shall be yours whenever you want, if only you will trust me with the magic charm and lend me your name."

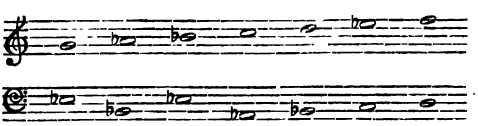
Of course, Fairy C is delighted, and that is how it comes to pass that sometimes Fairy B is seen with the charm, and called little C-flat. Here is a picture of her when she is singing for Fairy C.



But never forget that the song is softer, lower, flatter. Fairy E is equally kind to poor little Fairy F, for, as you see, no little goblin is to be found on little F's left side. Still, it gives Fairy E the opportunity to be kind and good to her neighbor, and that is one of the beautiful things piano fairies love. Here is Fairy E carrying the magic charm, and therefore bearing the name of Fairy F:



This time we will have a game of "hide and seek"; the little fairies will be away, and our work is to discover their little flat goblins, and ask them their names.



COLORS AND HOW TO USE THEM

IF we could only dip our paint-brushes in the rainbow, what lovely colors we should have to paint with! The red, blue, and yellow which we see there are very different from those same colors in our paint-boxes. Red, blue, and yellow lights make white when they are mixed together; but if we mix those colors in paint we get grey or black. Some colors look better together than others; some make each other more brilliant, and some more dull, if they are near each other.

We will try to see this for ourselves. If someone can give us some colored papers—red, blue, yellow, violet, green, and orange—we can cut out squares and disks, and try combinations of color for ourselves. But a better way, if we can manage it, is to paint the shapes on white paper and cut them out.

A pair of compasses, or a tea-cup, will make circles; the squares we have learnt how to make. The circles should measure two inches across—that is, if we use compasses; the distance between the two points—*the radius*—should be one inch. Three other circles should be three inches across, and the three squares four inches. All sides must be alike for a square, you remember.

The three smallest circles we will color red, blue, and yellow. These three colors we cannot make for ourselves by mixing any others together; they are called *the primary colors*.

Use cobalt for the blue, gamboge for the yellow, scarlet lake for the red. If there is no scarlet lake in our boxes we will mix two reds together—crimson lake and light red.

The three larger circles we will color with the same colors, and the squares, too. We must wait till they are all dry, and then we will cut out the three small circles, and put them under a heavy book till we want them. The other circles we are going to change into other colors; and if they are quite dry we can begin by damping them very lightly with a sponge, and then blotting them carefully, one at a time.

Now we will cover the blue disk with yellow to make green, the red disk with blue to make violet or purple, and the yellow one with red to make orange. These are the *secondary* colors; we see them in the rainbow when the primary colors join at the edges.

Now the squares must be turned into violet, green, and orange, in the same way, and left to dry. We can cut out the second circles while we are waiting. When the squares are dry, we change them once more by covering the violet square with orange to make russet or brown; by covering the green square with violet to make olive; and by covering the orange square with green to make citrine.

Now we have what are called *tertiary* colors, and we find them very useful.

When all the squares and circles are cut out, we will try every combination of color we can think of by placing the circles on the squares, or overlapping them. We shall see how some colors make the others brighter. For example, red is made brighter by green, blue by orange, and yellow by violet.

Let us take a long look at the red disk, then quickly at the white ceiling, and we shall see a greenish spot.

If we look at the yellow setting sun we see the sky full of little blue suns; a long look at blue makes us see orange, if we afterwards look at a white surface.

There are little nerves in the eye for seeing the three colors; if we look too long at one, the nerves that see that color are tired, and only those that see the two others can work, and so we see green—made of yellow and blue—when we have looked too long at red; violet—made of blue and red—when we have tired the nerves that see yellow; and orange—made of yellow and red—when our eyes have been tired by blue.

So we learn that too much of one color tires the eyes; we say it dazzles them, and we must put some of the other colors with them to rest the eyes. We can make other experiments with oranges, balls of wool, bright-colored books, and we shall find how different positions make colors change. Wet sand looks blue instead of brown if the sky is blue above it, and the dirty puddles in the road look golden in the setting sun.

The more we learn about color the more lovely things we shall be able to see in the world around us.

LITTLE PICTURE-STORIES IN FRENCH

First line: French. Second line: English words. Third line: As we say it in English.

Aujourd'hui nous irons voir le tombeau de Napoléon avec maman et papa.
To-day we shall go to see the tomb of Napoleon with mamma and papa.
To-day we are going with mamma and papa to see Napoleon's tomb.

Papa appelle un taximêtre. Nous montons tous. Bébé reste chez nous.
Papa calls a taximeter. We mount all. Baby remains at the house of us.
Papa calls a taximeter. We all get in. Baby stays at home.

J'aime un automobile, parce que ça va si vite. C'est très agréable.
I like a motor-car, because that goes so quickly. That is very agreeable.
I like a motor-car, because it goes so fast. It is fine.

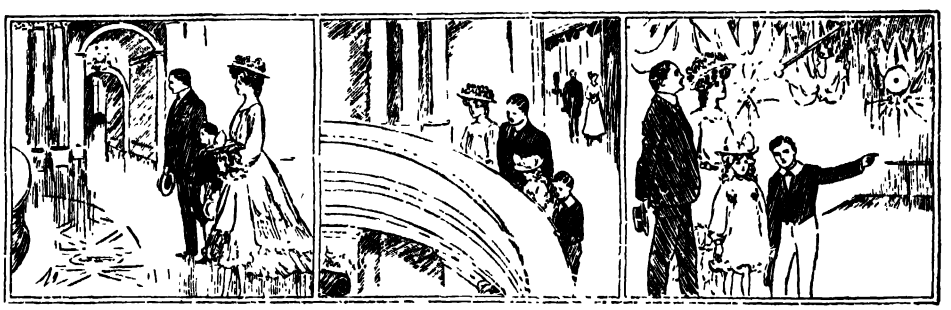


L'automobile s'arrête, et nous passons par la porte cochère.
The motor-car itself stops, and we pass by the gate for carriages.
The motor-car stops, and we go through the gateway.

Papa dit : " Attendez-nous, s'il vous plait. Nous ne serons pas longtemps."
Papa says : " Await us, if it you pleases. We shall be not long time."
Papa says : " Wait for us, please. We shall not be long."

Nous entrons. Il y a un grand trou dans le plancher, entouré d'un mur.
We enter. It there has a great hole in the floor, surrounded of a wall.
We go in. There is a big hole in the floor, surrounded by a wall.

Nous regardons en bas. Au-dessous est le tombeau dans une grande salle.
We regard in down. At the below is the tomb in a large hall.
We look down. Below is the tomb in a big room.



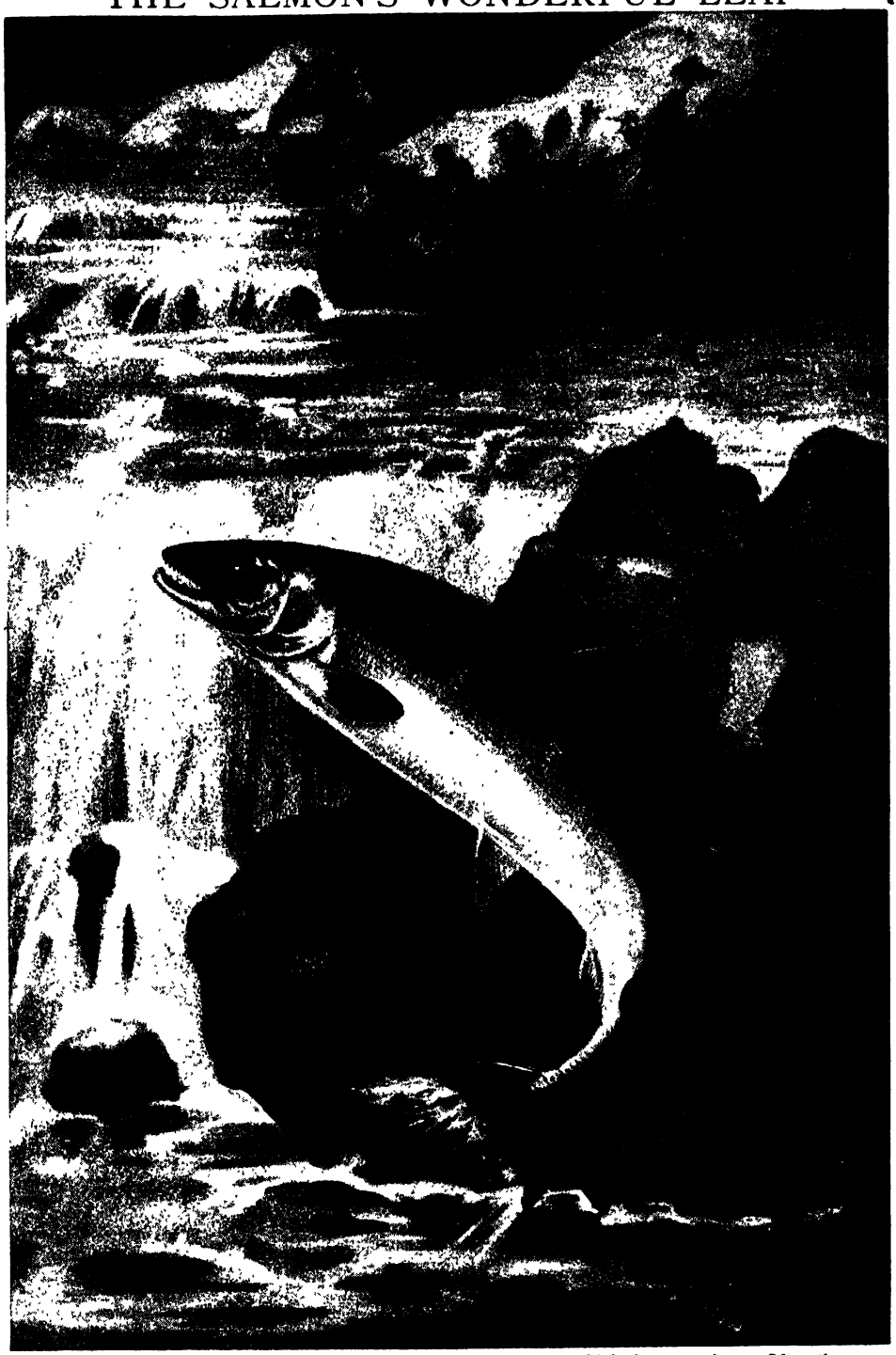
En arrière du tombeau il y a une grande chapelle. Elle est ornée de drapeaux.
In the behind of the tomb it there has a large chapel. It is adorned of flags.
Behind the tomb is a large chapel. It is decorated with flags.

Il y a des épées aussi. Je désire être soldat comme le grand Napoléon.
It there has some swords also. I desire to be soldier like the great Napoleon.
There are some swords too. I want to be a soldier like the great Napoleon.

J'ai un livre sur Napoléon. Je le lirai à Jeannette cet après-midi.
I have a book on Napoleon. I it shall read to Jenny this after mid-day.
I have a book about Napoleon. I shall read it to Jenny this afternoon.

THE NEXT SCHOOL LESSONS BEGIN ON PAGE 8921

THE SALMON'S WONDERFUL LEAP



Salmon, when they get fat and strong, leave the sea for the rivers in which they were born. Often there are rocks and waterfalls in the river, but the salmon, which is very powerful, leaps up the rocks. Sometimes, as we see here, a fish leaps over the rocks at a single bound. At other times it has to make many jumps, and to struggle up from rock to rock. When the falls are too steep, men make ladders to help the salmon.



FISH OF THE RIVERS AND LAKES

CONTINUED FROM 2618

WE have all noted, in reading these stories of Nature, how fortunate we in North America are in having few sharks and other dangerous fish in the waters off our coasts. While feeling thankful that this is the case, the thoughtful student must wonder how it is that we lack the fishes that are dangerous to life, yet have those about us which are good for food. Here an interesting law of Nature comes to help the imagination.

As a general rule, the fishes which belong purely to the ocean cannot live in the fresh water of rivers and lakes. We can all understand this in regard to the deep-sea fishes. They *must* have a heavy pressure of water upon their bodies, or, as we have seen, they will die. Naturally, then, they cannot come into the shallows near the coast, to say nothing of the still more shallow waters of the rivers.

There is a further barrier against other sea fishes; they must have the intense saltness of the seas to which they are accustomed; and so they cannot safely stray beyond the limits of their home. Then there is the question of the warmness of the water. Ocean fish, accustomed to the upper levels of warm seas, would die if they had suddenly to move to cold seas. In this respect, the deep-sea fishes have a big advantage, for, although they cannot rise to the surface, they can travel very far, so long as the water is deep enough. Below a certain level the sea varies little in temperature; hence deep-sea fishes could travel in deep water from Equator to the Poles without feeling any ill effect.

But there are exceptions to every rule, and there is an exception to the rule that fishes of the ocean cannot travel far. Sharks go with the tide up certain rivers. They are to be found in the Lake of Nicaragua, and in the Viti Levu Lake, in Fiji, living always in fresh water. Again we find a species of saw-fish living in a fresh-water lake in the Philippine Islands. We have still more interesting exceptions to the rule in the case of fishes which, born in the rivers, like the salmon, go out to sea to grow; or, like the eels, born in the sea, come up the rivers to get fat and big. Some fishes, on the other hand, are so delicate that if we take them, with ever so much care, from the rivers in which they were born, and place them in other rivers of the same sort of water, they die.

And yet others, like the European fifteen-spined stickleback, we can bring in from the sea, turn loose in the river, and they will be all right. Then we have the lung-fish brought from South America, curled up in his mud-clod, to revive in a tank in a hot-house; while carp can be frozen

solid in ice, and taken from one side of the world to the other, to melt out and be as lively as possible.

The king of fresh-water fish is the salmon. Some people call it the king of *all* fish. Certainly it is one of the handsomest and, at the same time, one of the pleasantest as food. Its life is a romance, which many great men have delighted to study, although they were for long puzzled by it. They used to see great salmon swimming up the rivers from the sea, and they used to see them swimming down again, but as there were no tiny salmon with them they could not think that salmon were born in the rivers.

WHERE DO THE LITTLE SALMON COME FROM, SWIMMING OUT TO SEA?

At other times they would see small silvery salmon going down the rivers by themselves, and they would wonder whence these had come. They sought them, but all they could find, when they made their search, were lots and lots of little fish, rather salmon-like in shape, but without silvery scales, and all barred across with black. These certainly were not salmon, they declared, or they would be like their parents.

But one year a keeper, a thoughtful Scotsman, took some of these little black-barred fish and put them in a pond, and kept them there. He watched them carefully until the spring of the following year, and saw the black bars grow less and less distinct, and a growth of silvery scales appear. At last all the bars disappeared, and there, triumphant in their splendor of silver, were the little salmon, all impatient in their desire to go down the river to the sea. Let us now try to follow the life of the salmon, large and small.

SALMON AT SEA LONG FOR THE RIVERS IN WHICH THEY WERE BORN

We will begin in the sea with the big fish, which, we learn, came down the river some months ago. They feed with enormous appetites, eating shrimps, sand-eels, young herrings, and whatever else comes in the way of their splendid sharp teeth. They get very, very fat—so fat, indeed, that when they are caught we can see the flakes of fat, called curd, between their flesh. Well, after all this feeding, they begin to long more and more for the river. They swim into the mouth of the river. Instinct tells them whether it is fit for them to begin their journey or not. If the water in the river is very low, they know that they will not be able to get up, so they wait until rain comes to fill the river; then, out from the sea, into the fresh water they go.

They do not travel in great shoals as the herrings do, but in small parties, one group after another. All goes well at the mouth of the river—the course is wide, the water is deep, and swimming is quite easy. They do not bother about food; they have eaten enough to last them for a long time.

This is really a marvelous provision of Nature. The food which big salmon require is not to be found in the rivers. Now, if the salmon were hungry they would have to turn and swim back to the sea; they could never get up the rivers. But they leave their appetites in the sea, and as they go up the rivers their throats and stomachs contract, so that they do not want to eat.

As they get higher up the river they are met by obstructions. There may be a natural barrier—a waterfall, perhaps. Well, salmon cannot be stopped by that.

HOW SALMON LEAP UP WATERFALLS AND CLIMB LADDERS IN THE RIVERS

Not even a fish can *swim* up rocks, but the dashing salmon makes his way up by a series of leaps and bounds. If the rise in the river be not more than six or eight feet, he will jump clean out of the water and make the ascent in a single bound. That seems to be about the limit of his powers. He does not believe it, however, and where there is a much higher obstacle he will gallantly go at it, though he may tumble down again and again in the attempt, and finally lie bruised and breathless on the rocks.

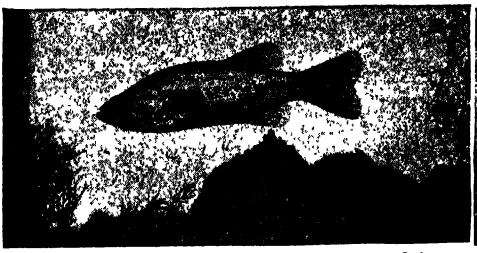
In many rivers where there are weirs, men make ladders up the rock for the salmon to climb. The ladder need not be broad, so that the rest of the river arrangements is not upset. It consists of a series of steps made of stone or wood, the steps placed, not right across, but about three-parts across the ladder, and arranged alternately. First we have a step branching out from the right; then we have a step branching out from the left. The salmon, after swimming from side to side of the river, and finding no natural way up over the rocks, soon learn that the path lies over this ladder, and up it they go, springing from side

FISH OF AMERICAN RIVERS AND LAKES





The brook trout is found in the streams and rivers of the East. This little fish is such a good fighter that it affords fine sport for the fisherman. The rock bass is found in every lake, river and stream of the Great Lake region and the Mississippi Valley. It is much more plentiful and easier to catch than the brook trout.



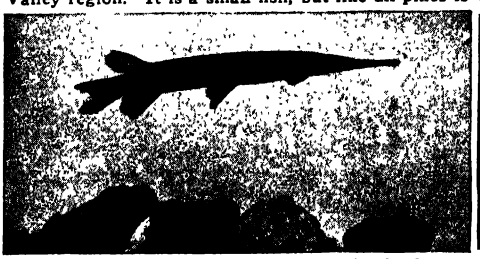


The beautiful black bass, a native American fish, was originally found in the great central plain region of the continent, but has been transplanted to the Eastern and the Western states and to Europe. Our yellow perch, which is smaller than its European cousin shown on page 2707, is usually found in schools. Both these fishes are good for food, and the black bass is the joy of the angler's heart.





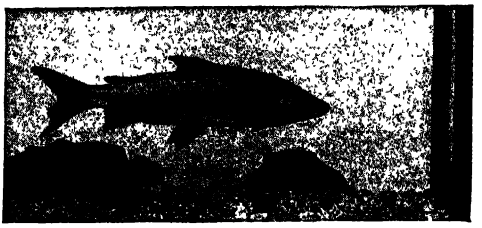
The mudfish or bowfin guards its eggs and cares for the young fish for a few weeks after they are hatched. The little pickerel—a member of the pike family—is found in the streams and ponds of the Mississippi Valley region. It is a small fish, but like all pikes is very greedy. It is seldom more than 12 inches long.





The short-nosed gar, which is not good for food, has its habitation in our northern rivers. The maskinonge, or muskallonge, which belongs to the great pike family, is a very greedy fish, but, like most of the pikes, is good for food. It is found in the Great Lakes, and the lakes of Canada, the Ohio Valley, and some of the northwestern states. It sometimes weighs as much as one hundred pounds, and a catch is a pretty sight.





The bright-colored sunfishes are related to the black bass. There are several different kinds of sunfish, and they are found in many parts of the United States. The common whitefish is a relative of the salmon, which lives in all the lakes of the Great Lake region. It goes up the streams and rivers to lay its eggs.

to side, just as the steps are placed. Of course, if there is anything like a gradual rise of rocks, or anything in the nature of what might be called jumping-steps, they will climb the highest waterfalls, just as we might. They are so strong, and spring so well, that, if it is possible for them to make a landing here and there only for a moment, they will master the ascent.

THE SAVAGE-LOOKING SALMON THAT FINALLY REACH THE HEAD OF THE RIVER

Well, in time they do get higher and higher up the river. They do not keep up this dreadful struggle day and night. After stiff climbing and swimming they come to nice sheltered pools in the river, and here they rest during the daytime, traveling for the most part at night. Still, they feel that they are called farther up the river, away to the source of it, even though it rise among the mountains. By this time a change has come over the appearance of the fish. The female has become darker in color; the male has lost his gaudy beauty. He has become a gloomy red in color, blotched with orange and dark spots. His shoulders have become thinner, and his head seems bigger and fiercer. The lower jaw, since he left the sea, has developed a fierce and huge beak, and the male salmon is savage and ugly to look at, and ready to quarrel with his own shadow. The reason is that he expects to have to fight for his mate.

Terrible battles now take place among the male salmon. Many of them are killed outright in the strife, and many more badly injured. In one year 300 salmon were killed in the Tay during these fights. When all the battles have been fought, or even while they are going on, the female makes her nest and lays her eggs.

THE NEST MADE BY THE MOTHER SALMON TO RECEIVE HER EGGS

Yes, she makes a nest, rough though it is. The spot that she chooses is always the gravelly bed of a swiftly flowing stream. The nest is made by the salmon lying on her side and ploughing up a trench by the vigorous wriggling movements of her body. In this trench she lays the eggs, then heaps the gravel over them. She may deposit eggs day after day for about ten days. A salmon lays about 900 or 1,000 eggs for every pound of her own weight. Thus, a salmon weighing 20 lb. will lay close upon 20,000 eggs. We reckon about 25,000 salmon eggs to the gallon, and a salmon weighing 25 lb. is expected to deposit a gallon of eggs in the nest which she makes. When the eggs have all been laid, the salmon, helped by the male, covers them all carefully over with gravel to a depth of some feet.

The purpose of the rough and tiring journey has been attained. The salmon have come up to lay their eggs. They could not lay them in the sea, for the eggs must be laid in fresh water. There they will lie in the gravel for the next ten weeks at least, or it may be even twenty weeks. It all depends upon the weather. The eggs are laid in the autumn, and the little salmon hatch in the depth of winter. Meanwhile, the old ones return to the sea. Men do all in their power to catch them as they ascend the river, but the fish are not molested on their way down to the sea.

THE SALMON'S BABY DAYS AND HIS COAT OF SILVER FOR THE SEA

Now we must follow the little salmon. When born they are ugly little things, with part of the egg attached to them. This part contains the food upon which they will live for the next month or six weeks. The baby fish has a mouth, but it takes no food during this time, relying upon the substance contained in its little pouch. When it begins to feed it is only a modest little creature of $1\frac{1}{4}$ inches in length. Four months afterwards it is double this length.

Now, for perhaps a couple of years, the young salmon has nothing to do but eat the food which the fresh water furnishes, grow fat and strong, and develop the armor of silvery scales which it is the ambition of every juvenile salmon to possess. When these have at last come, the young salmon become very restive and desire to see the world. So, between March and June, they set out in shoals for the sea. They pass easily over the waterfalls and weirs and other obstacles in their way, but, no matter how fast they go, they seem to note the route so as to be able to find their way back. Not all the youngsters go down together. Some may go down after a year, others may remain at home for three years before setting out. And not *all* that go out return to the river

in which they were born. Some wander into other rivers, but the majority go back to their own.

Those that are to return in the first year have not long to stay in the sea. They eat, and eat, and eat as much as they can, and grow at a marvelous rate. They go out as smolts—that is their name in the first seaward-going stage of the youngsters—and then they weigh only a few ounces. They stay three or four months, and return as grilse—that is, young salmon, different from the big salmon only in point of size. But when they come back the fish of a few ounces have grown in three or four months to from 3 lb. to 6lb.

THE SALMON'S MANY ENEMIES AND HOW NATURE PRESERVES THE FAMILY

They have had their fill of rich seafare; they long now for the home in which they were born. Little salmon and big salmon set out for the river-head again, and little ones and big ones go for the same purpose, to lay their eggs, so that the stock of salmon in the world shall not fail. It is well that they lose no time, for, though the eggs of salmon are so numerous, their enemies are countless. Big trout eat the eggs which escape from the nests. Birds and fishes eat the young ones in the streams. Big salmon eat the little ones as they go down the stream; sea-gulls and other fish-loving birds plunge into the water after them; and sea-fishes, and, in some countries, seals and sea-lions, lie waiting at the mouths of rivers to eat salmon till they can eat no more.

THE SALMON OF THE WESTERN COASTS

So far we have read the story of the Atlantic salmon, but the story of the salmon of the Pacific is no less interesting, though it has a different ending. When the salmon of the Pacific has laid its eggs, it dies.

There are five different kinds of salmon on the Pacific coast, all closely related to the Atlantic coast salmon. These are the sockeye, the chinook or quinnat, the silver salmon or coho, the dog salmon, and the humpback. All of them come up to fresh water to spawn, but the sockeye, the chinook and the silver salmon are the most important, and it is these beautiful fish that make the Pacific Coast fisheries so valuable. The silver salmon runs up the shorter rivers, the chinook lays its eggs perhaps a thousand miles inland in the waters of the large rivers and at other times probably lives in the sea within a few miles of the coast. Of all these fish, the sockeye is the most interesting. When the spring snows begin to melt, and fill the rivers, the sockeye comes out of the deep from no one knows where. It comes, not in thousands or hundreds of thousands, but in thousands of millions, to face the long, long journey up the rushing streams of the Columbia, the Fraser, the Yukon and other northern rivers. Nothing stops it, nothing daunts it. On and on it goes through swirling rapids, and up cataracts until it reaches its destination in some quiet lake far up in the Rocky Mountains. There, in the shallow waters of the lake margin, the gravelly nest is made, the eggs are laid, and then both male and female salmon die.

The eggs hatch out in from four to six months, and the young fish live in the water in which they were born for about a year. Then they swim down the rivers to the sea and disappear for about two and a half years. At the end of that time they come back, and make for the waters of their native lake, to follow the example of their parents, and lay their eggs and die. From the moment they reappear, they are surrounded by enemies. Millions upon millions of them fall a prey to sea-lions, bears, fish-eagles, but their worst enemy is man, who comes with all the skill his mind can teach him, to catch and kill them.

THE GREAT SALMON FISHERIES OF THE PACIFIC COAST

But though the fish are killed by man, their usefulness is not ended. They provide work and food for many, and the value of the salmon fishing industry of the Pacific Coast is enormous. In Alaska alone 400,000,000 pounds of salmon were taken in 1915 and brought in the sum of $21,000,000, while the value of the British Columbia fishery is nearly half as much. Think of the hordes of fish these figures represent

HOW MEN REAR SALMON AND SET THEM FREE IN OUR RIVERS

Of course such harvests mean that if care were not taken, very soon the salmon would begin to disappear. If every year every salmon possible

should be caught before it reached the spawning grounds, before long there would be no salmon at all.

In spite of the enormous numbers of salmon which are hatched naturally, men have, after much careful study of the subject, now become able to hatch salmon eggs artificially. The eggs are gathered and carefully preserved in large tanks in this country, and in Europe in hatching-ponds. When the young ones appear they are kept in great ponds, safe from enemies and well fed, until they have reached a size at which they are able to take care of themselves. Then they are turned loose. In this way we are able to stock rivers which have no salmon.

Included in the famous salmon family we have the salmon trout. These are also called sea-trout. They are not so large as the salmon, though some weighing between 20 lb. and 30 lb. have been caught. Their flesh is pink, like that of the salmon, but not so rich. Their habits are like those of the salmon, for they ascend rivers to lay their eggs; and, as they are smaller than the salmon, and therefore not so strong, we may imagine how great is the courage they show in overcoming the difficulties in the way of barriers which tax even the strength of the great and lusty salmon.

THE TRAVELS OF THE TROUT

The sea-trout and the bull-trout are the only members of this family which go out to sea. The others remain all their lives in fresh water. These are among fish which very often we see leaping out of the water after flies. They are hungry creatures, and eat any number of other fishes' eggs, and even young fish. But the food of which they are fondest consists of fresh-water shrimps and worms and slugs, which heavy rains wash into the rivers and lakes. But they are not particular; one was caught which had a young viper in its mouth. They have the wonderful power of making their color fit their surroundings.

The trout show the same instinct for the preservation of their species as the salmon. Between the beginning of October and the end of November they make their way to the gravely head of streams, and there they lay their eggs as the salmon lay theirs, and carefully make a nest.

COUSINS OF THE SALMON THAT DO NOT GO TO SEA

Not all the cousins of the salmon go to sea. Some trout stay in the fresh water of the lakes, and of these a very useful member of the family is the Mackinaw or Great Lake trout. It is a greedy fish, and it is said that it will even eat a jack-knife. Great numbers of these fish are caught every year, and at one time it seemed as if they might soon be numbered among the disappearing fishes. But the government hatcheries began to hatch them by artificial means, and once again the fishery has become valuable.

The whitefish of the Great Lakes and the northern lakes is also a relative of the salmon which stays in fresh water. This fish goes up the streams and rivers to lay its eggs, and then goes back to the deep water of the lakes to live. The whitefish fishery of the Great Lakes is very important.

A HERRING THAT NEVER SEES THE OCEAN

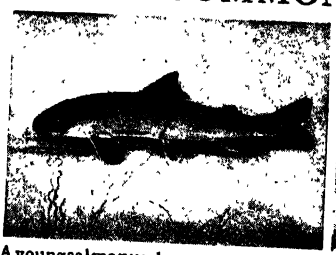
Another lake fish about which we ought to know is the cisco or lake herring, which is not a herring at all, but a cousin of the salmon and the whitefish. It is a beautiful fish with blue-green back and silvery sides, and perhaps is called a herring because it swims about in schools. Large numbers of this fish are caught every year and sent to market.

ANOTHER FISH THAT COMES BACK FROM THE SEA

Fish that leave the sea and swim up the rivers to lay their eggs are said to be andromadous, and the dictionary tells us that this long word means that they pass up from the sea to fresh water. An andromadous fish that is not related to the salmon is the bony shad. This fish comes up the rivers of the Atlantic coast all the way from Florida to Newfoundland. It is so valuable as food that the Fish Commission of the United States had it "planted" in the western rivers, and it is now as well known along the Pacific coast as it is on the eastern side of the continent. Next to the salmon and the cod, the shad fishery is the most important in the United States.

We pass now to a very stay-at-home fish—the pike. This is the fiercest fish in our waters. He will eat anything—rats, ducks, water-hens, young geese,

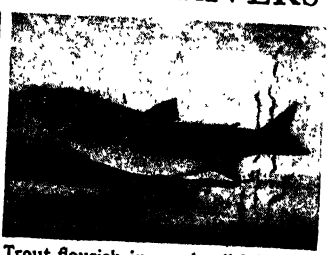
SOME COMMON FISHES OF THE RIVERS



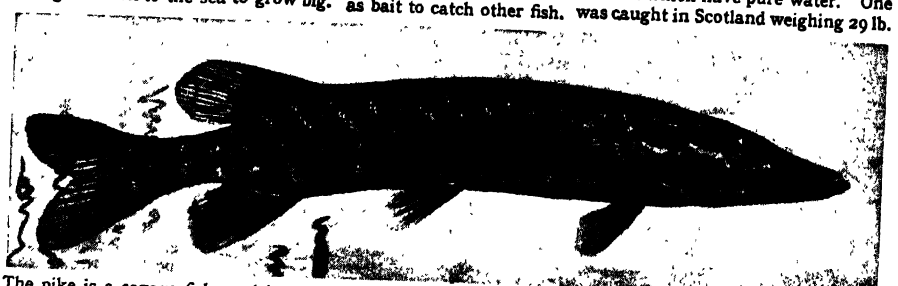
A young salmon undergoes a good many changes ere it is the handsome fish that goes down to the sea to grow big.



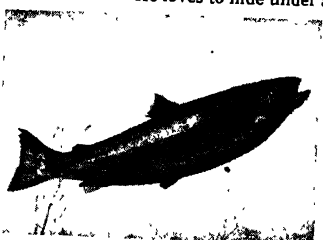
Gudgeon are common English fish. They are often used as bait to catch other fish.



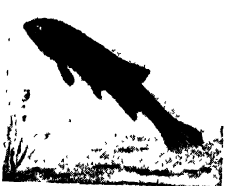
Trout flourish in nearly all lakes and streams which have pure water. One was caught in Scotland weighing 29 lb.



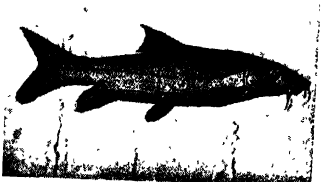
The pike is a savage fish, and is called the fresh-water pirate. He will eat rats or birds, and even his own children. He loves to hide under a bank or under the root of a tree, and to dart out and seize his prey.



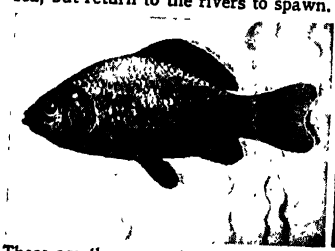
The salmon trout are also called sea-trout. Born in the rivers, they swim to sea, but return to the rivers to spawn.

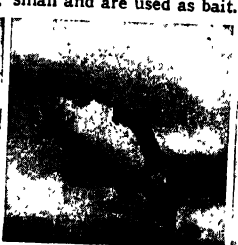


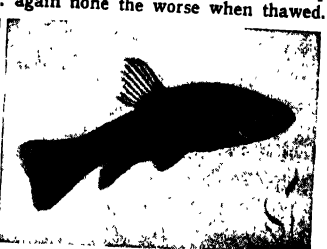
Minnows are of the carp family; some are very small and are used as bait.



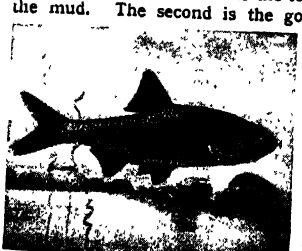
The barbel is a queer fish. He sleeps when frozen solid in ice, and wakes up again none the worse when thawed.

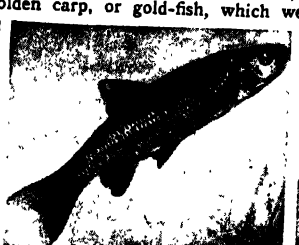


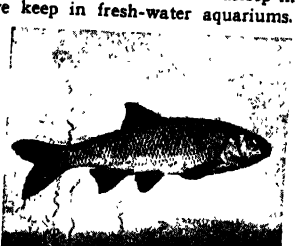




These are three members of the carp family. The first is the Prussian carp, which, unlike the common carp, has no pendants from the lower jaw. The third is the tench, which passes the winter asleep in the mud. The second is the golden carp, or gold-fish, which we keep in fresh-water aquariums.







In these pictures we see three more fishes. These are the roach, on the left, the chub, in the centre, and the dace, on the right. This helps us to remember how numerous is the carp family. Although these are very different in size and form from minnows and gold-fish, they are all members of the same carp family.

fish, frogs, snakes, and even his own family. The only thing to which he says "No" is a big, healthy perch, whose sharp spines are too much even for the mouth of the river-pirate, as fishermen call the pike. If the young pike, or jack, as it is commonly called, can escape the jaws of its relations, it soon grows into a nice-sized fish, and shows itself as hungry as its parents.

The pike, however, is not the only member of its family that lives on this continent.

The delicious pickerel is a pike, and so is the giant maskinonge of the Great Lakes and the lakes of Canada. This fish may weigh as much as 80 lb., and reaches a size of from 4 to 6 feet.

HOW THE CARP CAN GO ROUND THE WORLD IN ICE AND WAKE UP AGAIN

One youngster, only five inches long, was found to have swallowed a gudgeon as big as itself, and was cheerfully swimming about with the gudgeon's tail sticking out of its mouth. The pike makes its home in a hole under a bank in weedy water, there to lie in wait for anything eatable that may come along. If nothing happens to affect it, the pike will go on growing for years and years. The average weight of a good pike is from 12 lb. to 20 lb., but they have been caught weighing 60 lb.!

A fish of the river and lake about whose age we know more is the carp, which was introduced into America from abroad more than forty years ago. Nothing seems to come amiss to it. Its first home was in China, but it flourishes equally well in Germany and Sweden and England. We can freeze the carp into a solid mass of ice, send it on a journey round the world, then revive it by melting the ice, and the carp will wake up and go about its feeding as if nothing had happened. But it does that sort of thing quite naturally.

FISHES STILL LIVING IN A STREAM WHERE MARIE ANTOINETTE MAY HAVE FED THEM

When the weather turns cold, and its pond freezes, the carp go to sleep in the mud under the ice, and bother no more about the world and its troubles until Spring's warm hand melts the ice and summons all living things to renewed activity. Taking life so easily, the carp naturally lives to a great age. In the stream running through the park in which poor Queen Marie Antoinette spent her happy days are great fat carp, crowding the water as they did in her day. It is said that in that stream there are to-day the very fishes which the poor queen fed more than 120 years ago.

The gold-fish which we keep in bowls and ponds are carp. They are wonderfully hardy creatures. They like hot water—that is, if they have plenty of it; but in aquariums the water should be kept cool. Very often they are kept in ponds into which the hot water from steam-engines flows. We always find them at the top, where the water is hottest. They get as fat as butter in water which is 90 degrees—nearly as hot as our blood. But if the pond freezes, all that is done is to crack the ice at the top to let them get air. Perhaps even that may not be necessary. Theirs is a very different constitution from that of great things like conger-eels, which, though accustomed to cold water, cannot sink if they come to the surface when there is a keen frost.

The carp tribe is quite a big one. Barbel, for which those men angle who cannot afford the luxury of salmon and trout fishing, form one branch of the family. Another branch includes the gudgeons, humble little fish which men catch mainly to use as bait for bigger fish, though the larger ones form excellent food for the table. We cannot stay to examine the roach, chub, and dace, well-known European fish.

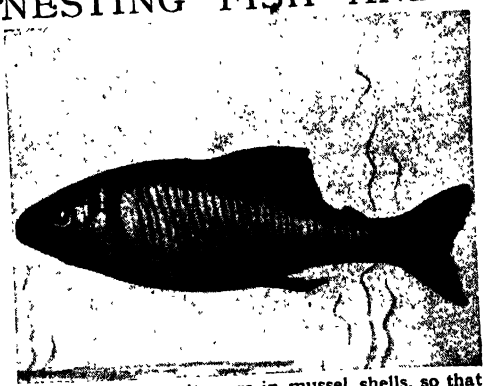
A FISH THAT LAYS ITS EGGS IN THE SHELL OF A MUSSEL

But we must not neglect the minnows, their small relations. Every boy or girl who has ever put a fishing-net into a pond may have been puzzled to know why these little fish are so differently colored at different times. The fact is that the minnows, when excited by food, become much brighter in hue than when quiet; and at night they are the soberest-looking little fish alive. They multiply rapidly, and are a never-failing source of food for larger fresh-water fish.

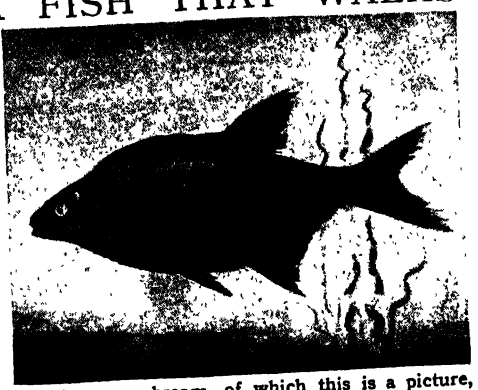
The tench is another form of carp, and, like its big cousin, loves to grovel in the mud and to sleep there, buried, during the cold weather. The tench lays many eggs, but not so many as a big carp proper, which lays about 700,000.

A very curious fish is the little bitterling, which, as its name implies, is very bitter, and we can use it only as bait for

NESTING FISH AND A FISH THAT WALKS



The bitterling lays its eggs in mussel shells, so that they may remain unnoticed and safe from danger.



The European bream, of which this is a picture, belongs to the carp family. Our bream is a sunfish.



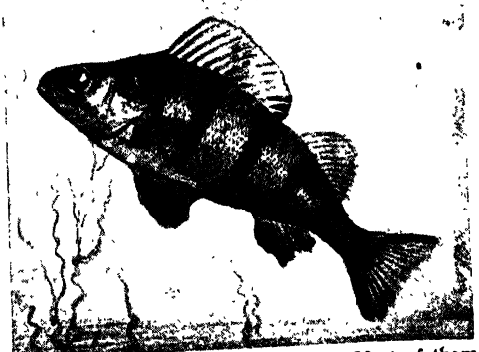
This fish, the bleak, is another carp. It has beautiful scales which are used for making artificial pearls.



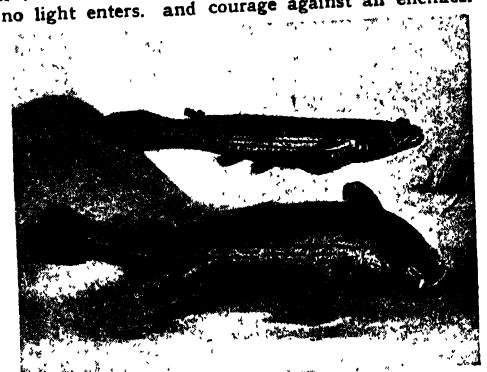
The Kentucky blind fish has no eyes, and lives in the waters of the caves where no light enters.



The bull-head eats other fishes' eggs, but defends his own with skill and courage against all enemies.



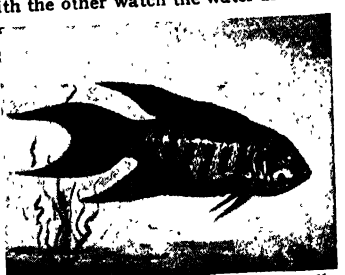
The perches are a numerous family. Most of them are small. This yellow perch seldom weighs over 2 lb.



The double-eyes have two pairs of eyes. With one pair they look up, with the other watch the water around.







These are three remarkable fishes. The first is the climbing perch, which, when his stream dries up, walks on dry land to find other water. The second is the little stickleback, which makes a nest and fights like a hero for his children. The third is the paradise-fish, which forms a nest of jelly-like bubbles blown from its mouth.

The photographs on these pages are by S. & W. Johnson, W. S Berridge, Lewis Medland, R Thiele & Co., H. J. Shepstone, and others

eels and perch. But it is an interesting little fish, for it has the cuckoo's habit of causing other creatures to hatch its eggs. The bitterling, when she wishes to lay her eggs, seeks the fresh-water mussel, and places the eggs within its shell. There they develop and are hatched, and the little bitterlings go off from their strange nursery not exactly knowing whether they are going to grow shells or fins.

Another common European fish is the bream. Anglers are quite happy if they catch one weighing a pound or two; but the giants of the family, living in Irish lakes, attain a weight of twelve or fourteen pounds.

Keeping still to the carp family, we come next to the bleak, a handsome little fish which pike and trout and similar fishes, as well as sea-gulls and terns, much relish as food. Bleak are interesting chiefly because of their beautiful pearly scales. These are so handsome that for ages they have been used in the making of beautiful artificial pearls.

FISHES WITH DOUBLE EYES AND FISHES IN CAVES WITH NO EYES AT ALL

There remain now some of the fish remarkable in regard to their structure or their habits. One is the famous double-eye of tropical America. Its eyes are among the strangest in the world. Each eye is really two eyes. The upper portion is shaped like a lentil, so is called lenticular; the lower eye is oval. The reason for this extraordinary formation is that the fish, when swimming, carries itself near the surface of the water, with the upper part of the eye just out of the water, and the lower half beneath the surface. Thus it can see what is happening in the air above it, and at the same time mark the progress of events in the water.

While these fishes have two pairs of eyes, there is one fish with no eyes at all. We know that there are blind fish at the bottom of the deep seas. No light can reach them, so some of them have no eyes, while others have to depend upon their own phosphorescence or that of other creatures, and have enormous eyes to catch any ray of light from such sources. But in the fresh-water fishes we do expect to find eyes. However, in the famous fishes of the great caves of Kentucky we find the eyes completely missing. In those still, deep waters there is no light. It is a dark subterranean fresh-water sea in which these fish live, and they are as blind as the rocks amid which they swim.

To make up for this they have remarkably acute hearing and sense of touch. They can detect the presence of a human being if he makes but the slightest sound near them, but if he keeps perfectly quiet he can catch them in his hand or net as they swim, pale and blind, to the top of the water. They find their food by their delicate sense of touch, which resides in a series of nerves upon the two top sides of the head.

FISHES THAT LEAVE THE WATER AND CRAWL MANY MILES ON DRY LAND

The perch, which is common in our rivers, is remarkable to us for two features—the enormously strong spines with which its back is armed, and the number of eggs it lays. A little perch, weighing only half a pound, has been known to lay more than a quarter of a million eggs. But the strangest perch of all the family is the climbing perch. This wonderful creature lives in India and Ceylon, where streams and ponds are apt to run dry. It waits as long as it can before moving to fresh quarters. The water gets lower and lower, and the fish may be seen melancholy in the mud.

At last the fishes can delay no longer. They climb the banks and set out for some place where, by a mysterious instinct, they know water is to be found. Their lower fins and strong backbone enable them to crawl along the dry land, and, of course, they breathe the air. In order that they may not die, as most fish would, they have a special arrangement inside the mouth which enables them to retain a large amount of water with which to keep their gills moist.

THE TRAVELS OF THE CLIMBING PERCH IN THE BLAZING NOONDAY SUN

So long as they can keep their gills damp they can live, and they scurry along to some other stream or pond, and topple in, thankful to get back to their native element. It is said that they climb trees, either to drink the water collected in big hollow leaves, or to catch the insects which may be found reposing there.

The spines of the perch are formidable, as the pike well knows, but they are less terrible than those with which the little stickleback is armed. The stickleback is one of the commonest fish we

have in our waters, but his life is as interesting as any. The little male stickleback is one of the best and most faithful of fathers.

THE WONDERFUL NEST THAT THE CLEVER LITTLE STICKLEBACK BUILDS

He makes a wonderful nest for the reception of the eggs. He gathers pieces of delicate fibre and weaves them together with his mouth, then places them in a little trough or other recess which he finds or makes for himself. He tries each piece of material to see that it is heavy enough to sink and cannot float away. If it is not quite as he wants it, he brings a little sand and drops that upon the material to weight it down. When all is ready he coats the fabric of the nest with a sort of cement which he produces himself, and makes a hole through it to allow his mate to pass in at one side and out at the other.

Then the female stickleback appears and lays her eggs in the nest. For the next three weeks the male stickleback guards the nest day and night. Big fish come up and try to get the eggs, but the brave little sentinel rushes at them with such force that, if they do not retire, his terrible spines may rip them open. Fish many times his own size he will put to flight in this way. This does not complete his cares. The eggs must be frequently moved so that they may all benefit by a full supply of fresh water. The intelligent little creature fans the water with his fins so as to force a current right through the nest, and he will also seize the nest in his mouth and rearrange the eggs within it, so that there shall be no possible chance of the eggs not being all treated alike by the pure water.

A FISH-FATHER WHO FIGHTS FIERCELY TO PROTECT HIS FAMILY

In three weeks' time the little fish hatch, and then his troubles are increased. The tiny things have no sense of danger, but swim about where hungry fish can catch them. He knows all about their peril, and, rushing after them, beats off the fish which would attack them, then carries the truants back, one by one, in his mouth to their nest or to the bottom of the water, where he can keep them together and safely guard them. When the young ones grow up, the father relaxes his care and soon dies.

The paradise-fish of China is another famous nest-builder. But here the nest is made entirely from materials supplied by the male fish. He blows bubbles of mucus from his mouth, and forms a nest under the water like that which the little insect called cuckoo-spit forms on our flowers. In that he places the eggs which the female fish lays, and there are born the little fish which it becomes his business to guard.

THE BLACK BASS THAT FISHERMEN LOVE

The black bass is another fish that prepares a nest for its eggs. This is done by the male fish, which scoops a round hole for the eggs and watches them until they are hatched. This beautiful fish may weigh as much as four pounds, and, wherever fishermen gather, tales are told of struggles to land some dark green-gold beauty, and its efforts to escape. The black bass was once found only in America, but has been introduced into Europe.

A FISH THAT CREEPS INTO HOLLOW LOGS

Some people have a foolish objection to eating catfish, perhaps because of its name, or because it has a number of sharp barbels or spines about its mouth, which give it an ugly look. Nevertheless, most of the catfish are very good to eat.

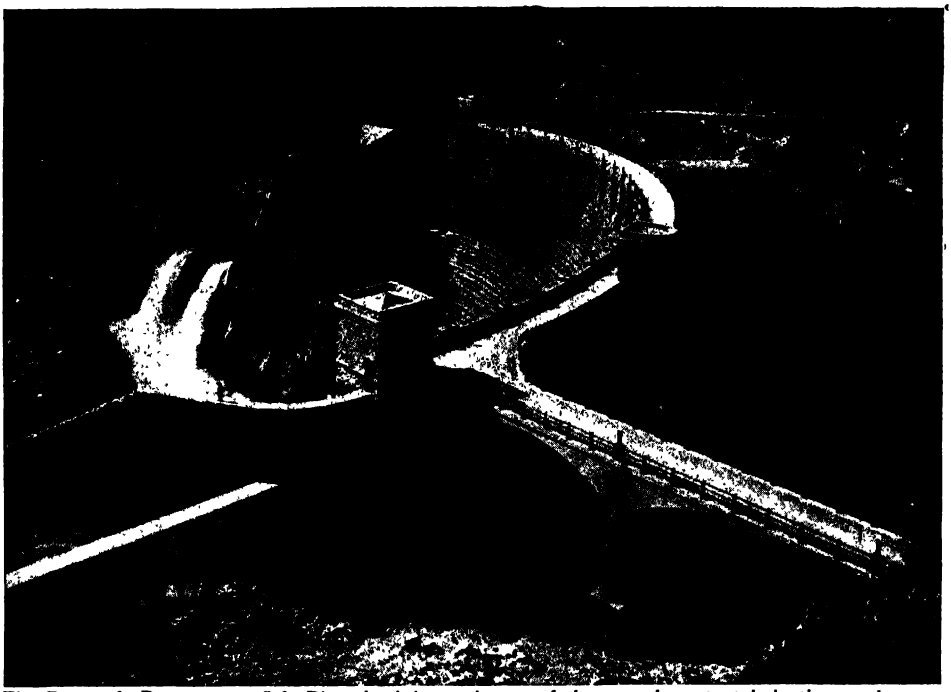
One member of this family, the goujon, likes to creep into hollow logs, and sometimes cannot get out, so that occasionally a goujon or mud cat is found after a log has gone to the sawmill.

HANDSOME FISH THAT "SIT" ON THEIR EGGS AND HATCH THEM

We have in the little bull-head of our clear northern streams a fish that eats other fishes' eggs. The eggs of the bull-head are placed in a hole which the male fish makes. He guards the eggs as carefully as the stickleback guards *his*. But there are fishes which actually sit upon eggs, even as birds do. These are members of the gay family of chromids, found in Africa and tropical America. The males make nests for the eggs, and rest in the nests upon the eggs until the latter are hatched. Among fishes there are many cannibals which eat their children, but there is some compensation for this in the examples of care, attention, and affection that we have been studying.

THE NEXT STORY OF NATURE IS ON 2849.

TWO GREAT DAMS IN THE WEST



The Roosevelt Dam, across Salt River in Arizona, is one of the most important irrigation works constructed by the United States. The dam is 1,000 feet long and 280 feet high. The curved side is up-stream to meet the current of the water. This shows the reservoir only partly full, and the water escaping through tunnels in the rock. Irrigation works like this bring many acres of fertile land into cultivation.



The Arrowrock Dam, on the Boise River, near Boise, Idaho, is more than 348 feet from the foundation to the top, and is, therefore, the highest dam in the world. It is more than a fifth of a mile long and the backwater extends twenty miles up-stream, forming a beautiful mountain lake. The stored water is carried down-stream twelve miles before it is diverted to the land to make the crops in the fields flourish.